Chemical Age

VOL. 83 No. 2121

5 March 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

SIR ALEXANDER FLECK RETIRES FROM I.C.I.

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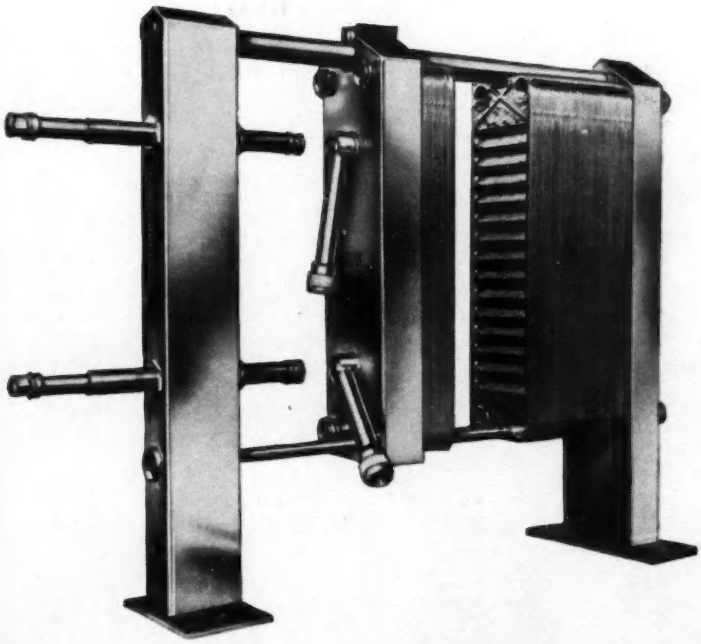

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Ammonium sulphate solutions
Ammonium phosphate (dibasic)
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Chlorinated Brine
Calcium lactate
Caustic soda solutions
Colloidal solutions
Crotonaldehyde
Diphtheria plasma
Effluents from—
ammonia stills
bottle washing machines
cellulose bleacheries
dye liquor vats
glue making
laundries
solvent recovery plants, etc.
Ethyl alcohol
Formaldehyde solutions
Glycerine solutions
Gelatine solutions
Glucose solutions
Latex
Lead fluoborate
Lime slurry
Metal polishes
Methyl alcohol
n-Methyl pyrollidone
Molasses solution
Oils—
cottonseed
linseed
gas (debenzolised mineral type)
hydraulic
lubricating (turbine)
mineral (various)
quenching
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Petrolagar emulsion
Phosphoric acid solutions
Photographic developer solutions
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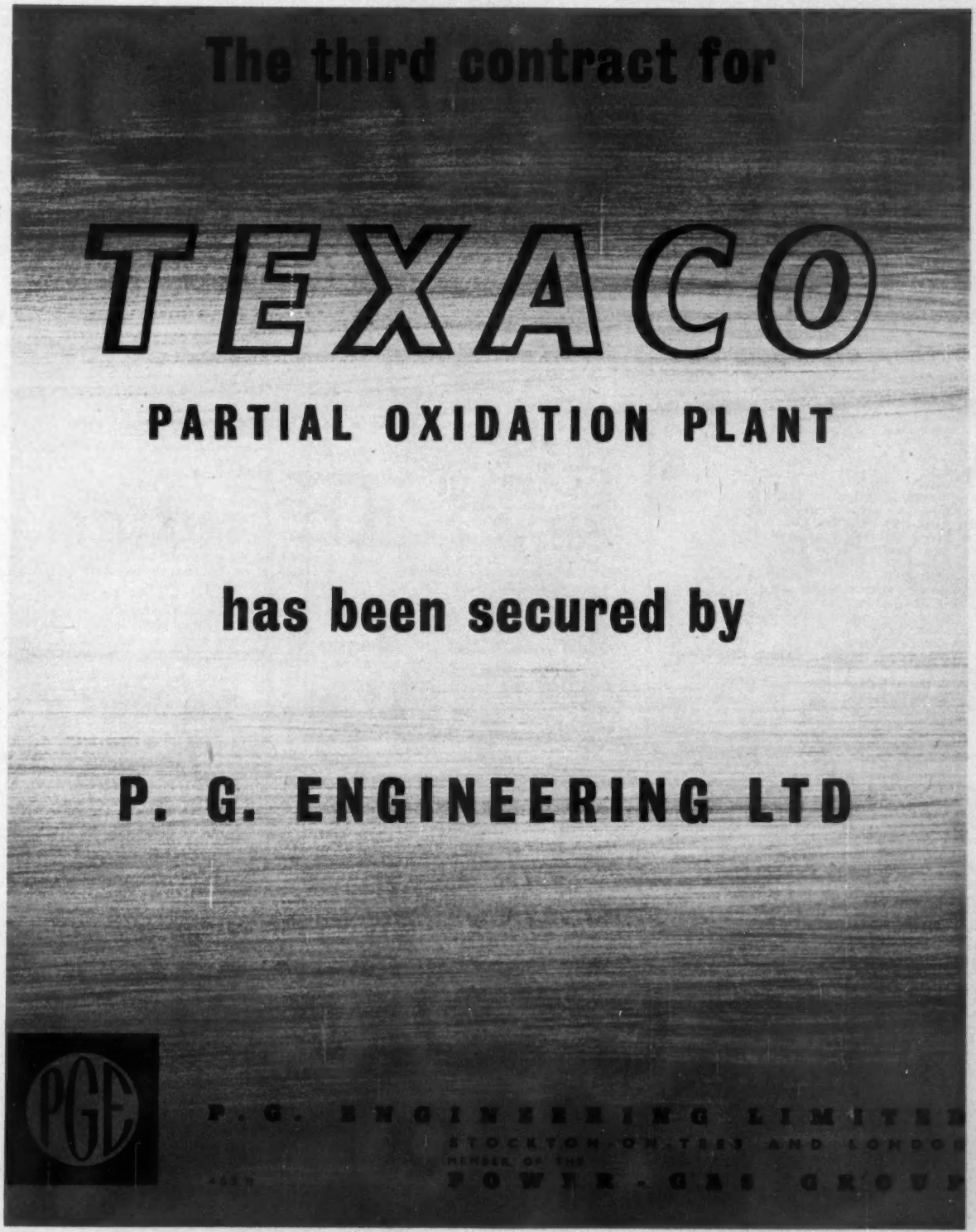
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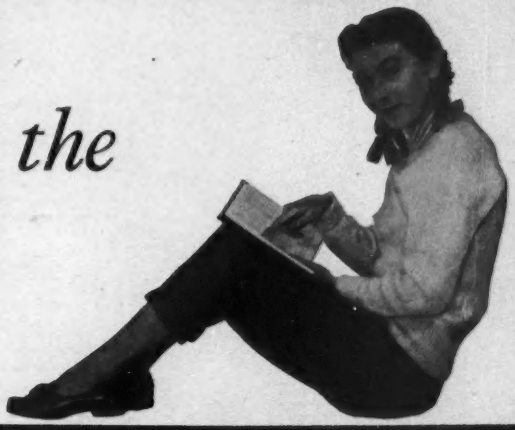
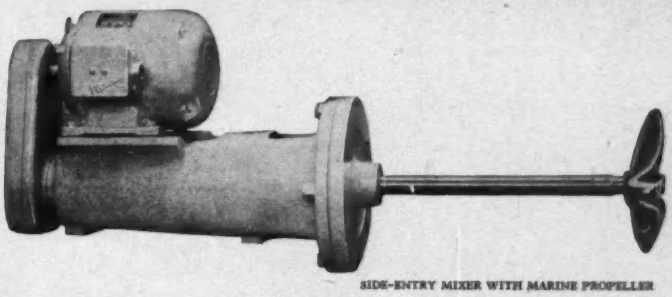


TOP-ENTRY MIXER WITH TURBINE MIXING-HEAD



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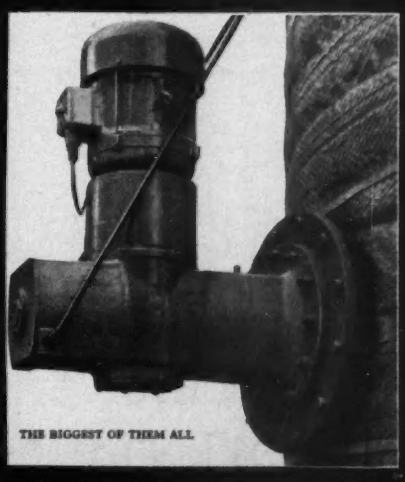

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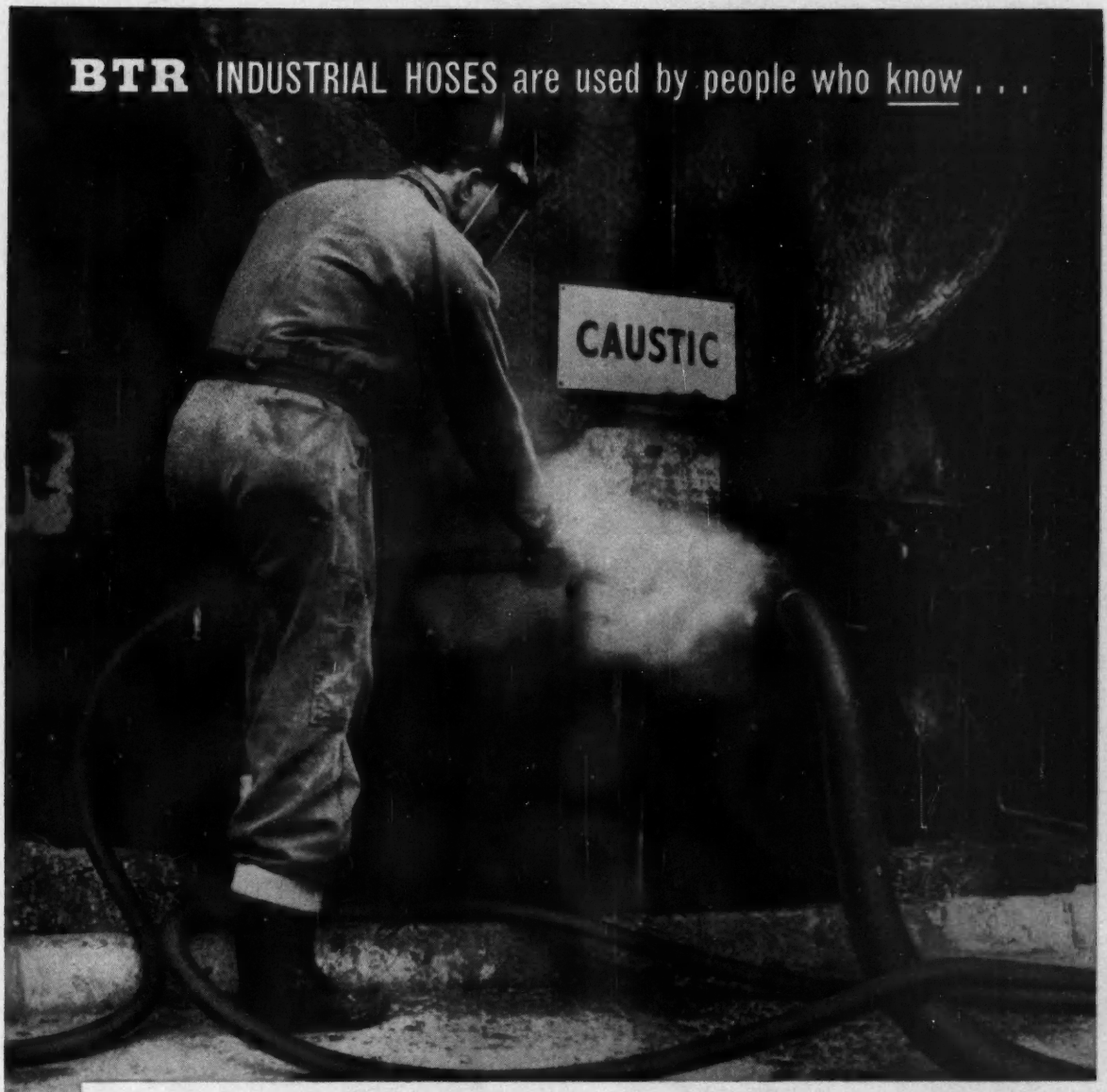

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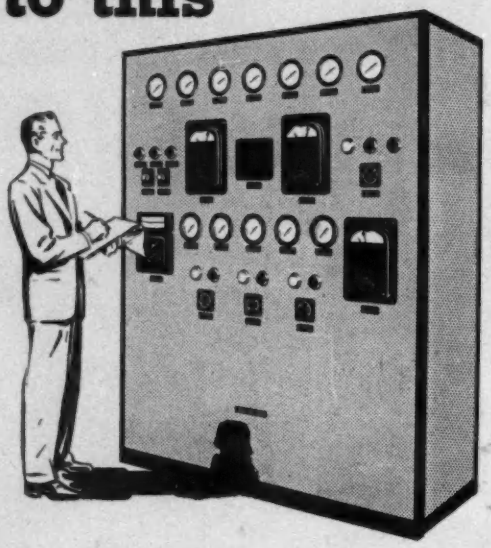

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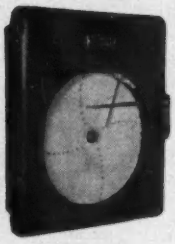

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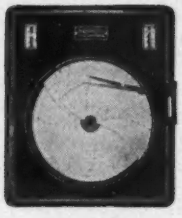

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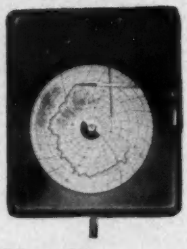

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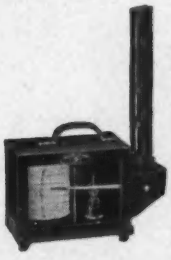

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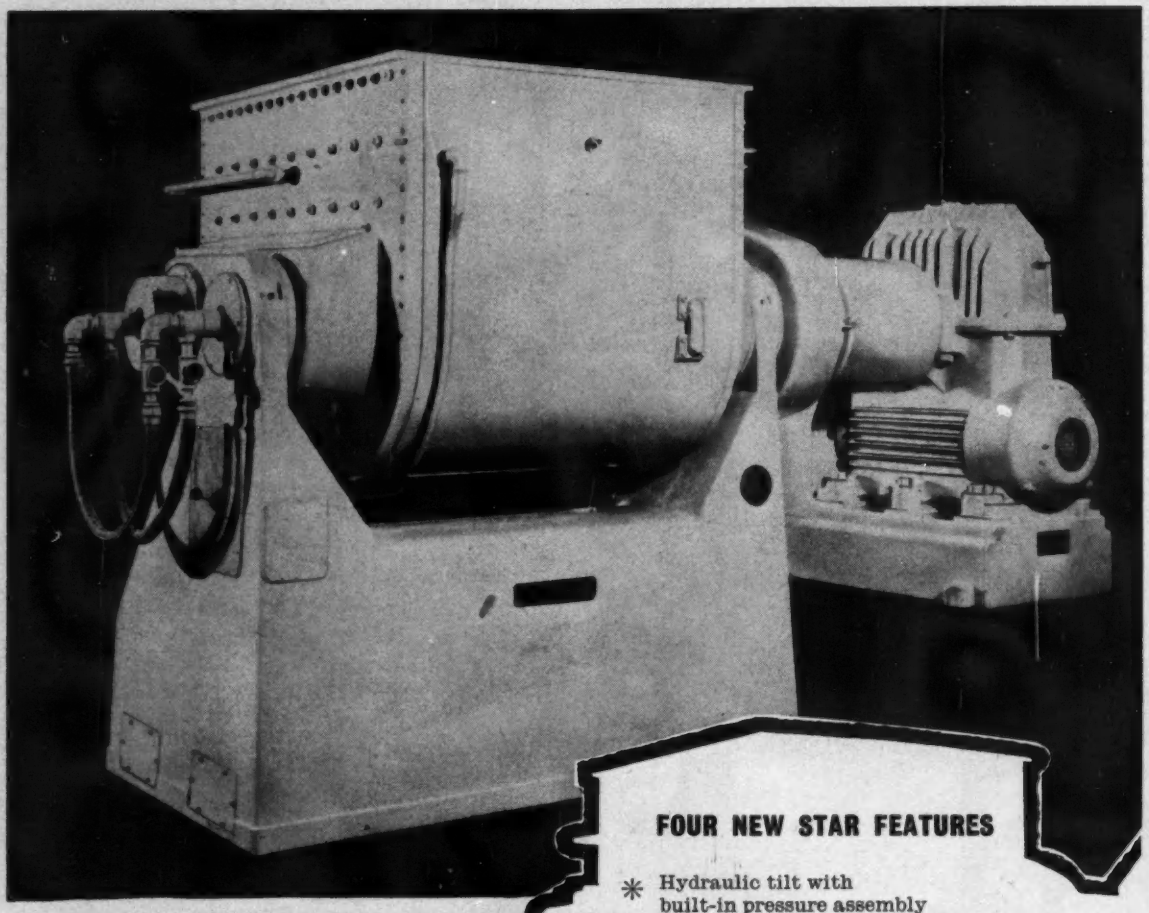

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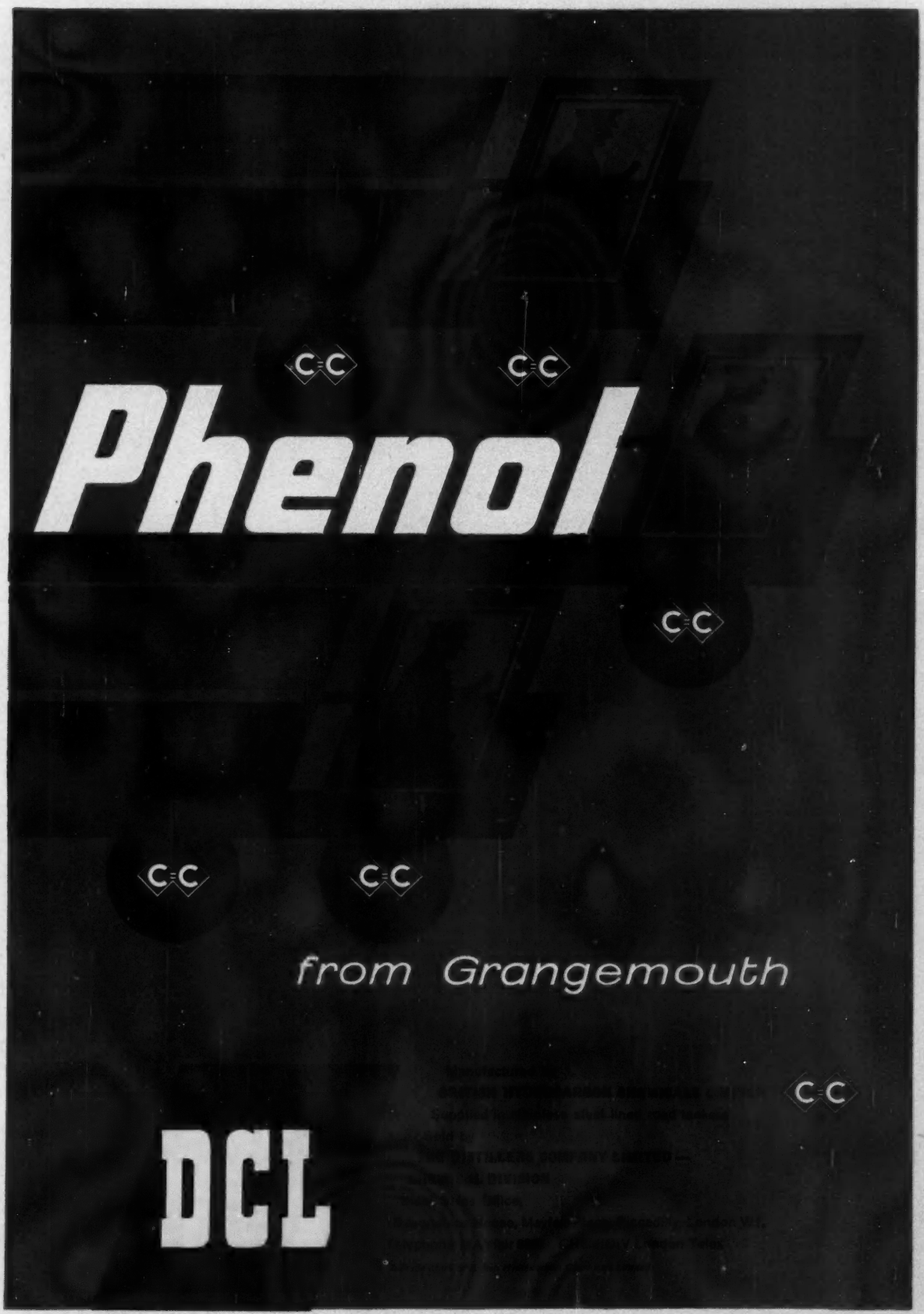
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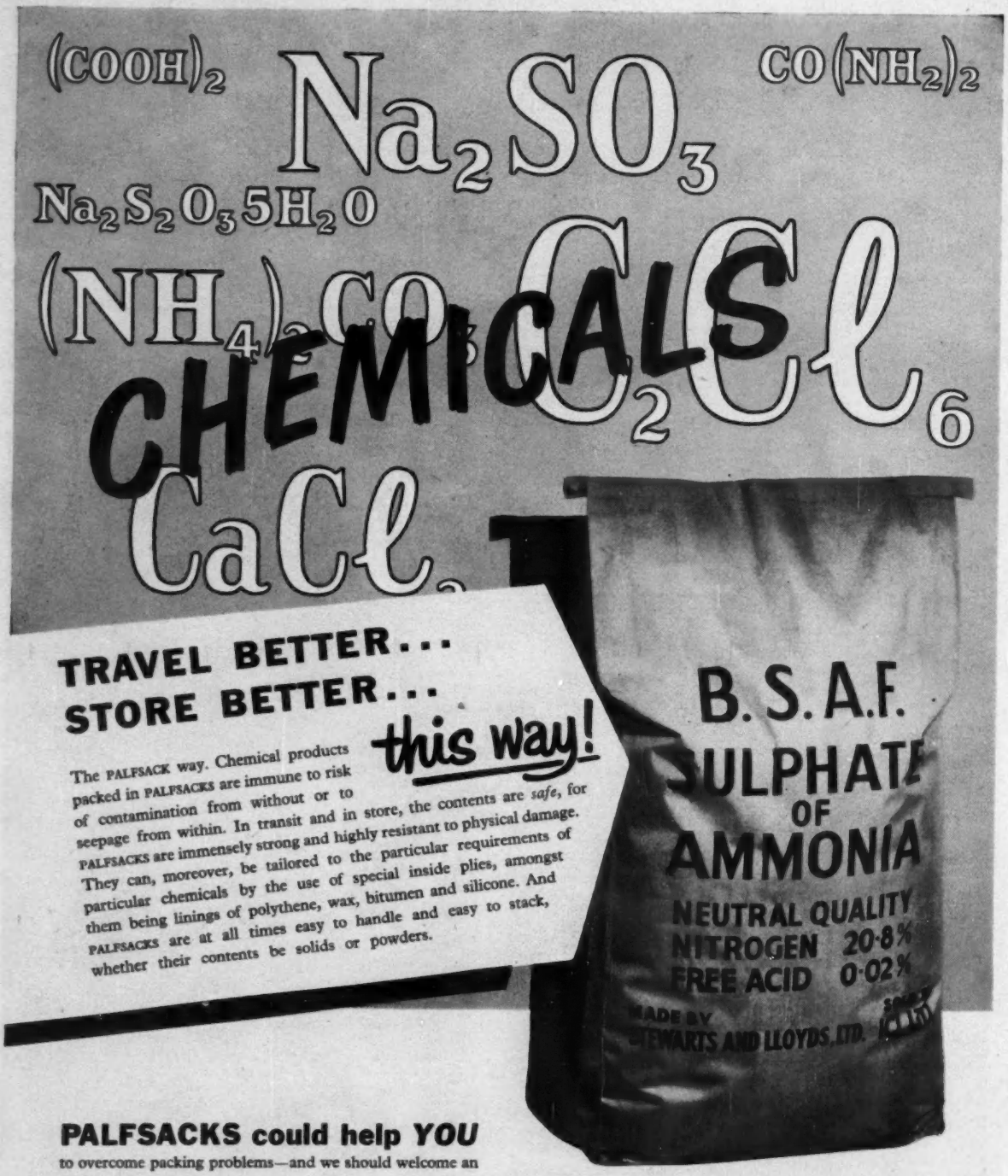
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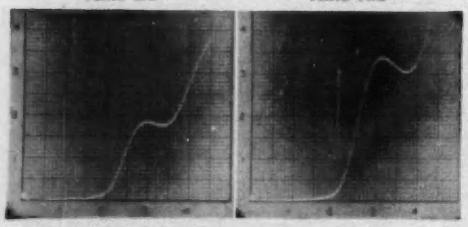
PLATE ONE PLATE TWO



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Determination of Cyanide in Effluent Sample. Introduce 5 ml. sample into two 10 ml. volumetric flasks, into one flask add 0.2 ml. of a standard cyanide solution, (50 µg/ml. CN^-), and make each up to the mark with 0.2N NaOH. Shake well. Transfer 5 ml. from each flask into polarographic cells, and de-aerate with nitrogen for 3 mins. Record the polarograms applying anodic oxidation on start potential -0.4V and scale factor 1.0.

x µg CN^- + 5 µg CN^- = 34 divisions (Plate 2)

x µg CN^- = 18.5 divisions (Plate 1)

$\therefore$ 5 µg CN^- = 15.5 divisions

$$x = \frac{5 \times 18.5}{15.5} \text{ µg}$$

x = 6.0 µg

Volume of sample in cell = 2.5 ml.

$\therefore$ Concentration of CN^- in sample = 2.4 µg/ml.

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TYPICAL CHARACTERISTICS

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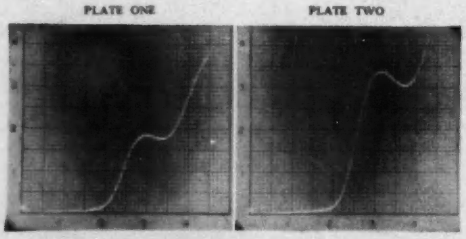

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TYPICAL CHARACTERISTICS

Non-inflammable		
Clear and colourless		
Free halogens		not detected
Specific gravity at 15.5/15.5°C		1.502
Distillation range (5—95%)		0.3°C
Residue on evaporation at 110°C	%	<0.001
Moisture H_2O	%	0.023
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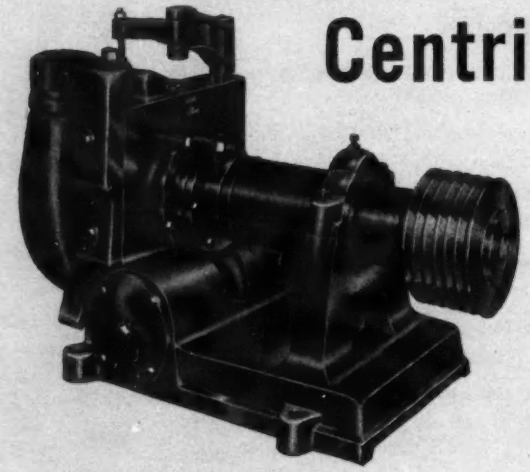

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CHEMICAL AGE

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PURITY IN FOODSTUFFS

FROM very early days, it has been recognised that the purchase of food needed to be adequately protected. Common law and special enactments were made to safeguard food and in the Middle Ages the markets of large cities and some of the country towns were supervised by officials. Guilds of merchants and traders, particularly the city companies, set standards for their members with penalties for infringement. By the 19th century scientific examination of foods was so developed that it was found that the sale of adulterated and contaminated food was widespread.

Action demanded by the public resulted in the setting up of a select Parliamentary commission and as a result the Act for preventing the Adulteration of Articles of Food and Drink was passed by Parliament in 1860. Thus Great Britain led the world in legislation for general food purity. The law was later augmented and strengthened and the present Act, the Food and Drugs Act of 1955, consolidated and extended the previous acts. It is appropriate therefore that the Pure Food Centenary (1860-1960) should be celebrated in London and in September (see p. 403) meetings, lectures and an exhibition will demonstrate the progress made in the last 100 years in establishing the purity of food.

Today the public is assured of a wide range of pure foods and the example set by this country has been followed by the Commonwealth, the U.S. and many other countries.

At the centenary conference, eminent scientific advisers in food purity will present papers and among the subjects to be considered are those concerned with international aspects of pure food and pure food legislation, the national problems as seen by Canada, Australia, and the U.S. and the manufacturers' contribution to pure food.

In the U.S., the call to the food, chemical and related industries to 'beware the sixth of March' has been heard many times recently, for it is on this date that the U.S. Food Additives Amendment to 1958 to the Federal Food, Drug and Cosmetic Act will become wholly effective. Dr. Bernard L. Oser, Food and Drug Research Laboratories Inc., New York, has indicated that this new law gives rise to many problems. Even what is meant by a food additive is the subject of much controversy.

Reports on the problem of chemicals in foods, spurred on by the recent much publicised cranberry case, have been called for by President Eisenhower and speculation appears to be rife with regard to what topics the scientists will report upon and whether pesticides, so often considered in the mind of the public as food additives, will be included.

Under U.S. food additives laws, there have arisen issues such as the safe tolerances to be laid down for food additives that cause cancer in animals, whether there is a threshold level for additives, and what is zero tolerance. Although the U.S. scientists called upon to report to the President will not make legislative recommendations it is widely believed that their reports will bring about a change in the Delaney amendment. Criticism has also been levelled at the Food and Drug Law as it affects farmers (as in the case of stithoestrol for fattening poultry and the cranberries). The purity of food supplies has in recent months been the subject in the U.K. of

highly emotional discussion, with pesticides regarded very much as food additives (CHEMICAL AGE, 23 January, p. 159). The national press, the food eccentrics and scientists have written on the tampering with nature so that confidence in the safety of food supplies has tended to be weakened. Very much the centre of discussions has been the problem of chemicals and cancer, for it is not known what causes cancer, or whether or how much of certain chemicals will give rise to cancer in human beings.

Manufacturers' references to food grade purity without the adoption of specifications and standards for the identity and purity of chemicals intended for use in foods to which all adhere, do not mean a great deal. Another problem looming on the horizon is packaging and the food industry. Though not *per se* a food, if the use of packaging material causes it or any part of it to become a component of food whether deliberately or through transfer, it can be considered to become a food additive. Responsibility for the effect of containers, plastics films, paper and metal foils used for foods is usually disclaimed by manufacturers of these products, either because of lack of knowledge of any likely toxicity of the chemicals used in manufacture or because of their small economic interest in the matter.

Composition and method of production of packaging materials for foodstuffs remain with the manufacturers and information is therefore not available as to whether chemicals used in producing the materials are considered dangerous for foodstuffs. In this category can be listed plastics, adhesives, inks, certain rubber products emulsifying agents and even mineral oils used to lubricate food machinery.

In the U.S. the needs of the food processing industries have forced inter-industrial co-operation. Already there is an industry-wide compilation of natural and synthetic flavouring agents sponsored by the Flavouring Extract Manufacturers' Association, a collection of data on polythene as a packaging material for fatty foods made by producers of the primary resin, while the American Petroleum Institute has sponsored studies of alleged carcinogenic potentiality of hydrocarbon waxes and the citrus industry has instituted investigations into pesticides and food colours. Legislation and scientific and technological achievement in the food industry have played a notable part in establishing present day high standards of purity in food and it is felt that the public are truly safeguarded. Press statements of recent months particularly with regard to pesticides and agricultural chemicals, however, have tended to cause public alarm and confusion. It is to be hoped therefore that the Pure Food Conference, while ensuring the press freedom and consideration, will see that statements are not published out of context or given more publicity than is rightly warranted.

U.S. O-XYLENE FOR EUROPE

NEWS that Cosden Petroleum have a large expansion programme under way at their Big Spring, Texas, petrochemical complex would not at first sight seem to be interesting news to the European chemical industry. It is reported, however, that the company, control of which has been acquired by W. R. Grace and Co., will increase *o*-xylene capacity from 10 million lb. a year to 80 million lb. by early 1961, and that like most of present *o*-xylene production, the bulk of the increased output will be for overseas markets and, in particular Europe. Fallek Chemical of New York will handle all export sales for Cosden.

According to Cosden's vice-president, Mr. Dan M. Krausse, design of the new *o*-xylene units will permit Cosden to double this new capacity to 140 million lb. a year, and he adds, when the company decides to use the extra 70 million lb. capacity, it may use the added production itself. At the moment Cosden make 99% *o*-xylene. When the new material comes on the market it will be in excess of 95% *ortho*.

Markets for *o*-xylene include synthetic resins, pharmaceuticals, and dyes, but Krausse suggests the real future for this product rests upon that of phthalic anhydride; particularly in Europe. He indicates that the U.S. imports substantial amounts of naphthalene from Europe, and European supplies of this phthalic raw material are actually shrinking. This, together with an increasing demand for phthalic anhydride and new technological advances in favour of *o*-xylene, it is reported, makes this product more competitive with naphthalene in phthalic production.

The 'shrinkage' of naphthalene supplies in the U.K. and Europe is inevitable. On the one hand fall off in steel production means less naphthalene available for home use and still less for export. On the other because of less tar production, there is less naphthalene; and tar production is dependent on coking and gas-making plants. Less coking is now being done at gas works because of the lowered demand for this product. Carbonisation plants are being allowed to run down or are getting old and hence are less efficient. Imports of natural gas and use of petroleum refinery gas streams are all having their effect on tar production. Also less crude tar is being distilled these days because as such it is a good fuel with a low sulphur content and thus is in demand for steel-making.

Naphthalene is still very much the product in demand in the U.S., as it is in the U.K. as a raw material for phthalic anhydride. The recent U.S. steel strike has caused a naphthalene shortage, and indeed, some phthalic anhydride producers changed partly, at least, from naphthalene to *o*-xylene as a raw material (see CHEMICAL AGE, 13 February 1960, p. 286). Monsanto Chemicals Co., U.S., was one but have now returned to using naphthalene exclusively since they find as other phthalic anhydride producers have found that naphthalene is more economical than the *o*-xylene route because yields with the former are better.

In this country naphthalene costs around £20 a ton to produce, but present selling price is listed at £100 a ton. The selling price of *o*-xylene is £50 a ton, with a correspondingly lower producer cost. It is regarded over here as a somewhat 'fancy' product and because of the lower yields obtained of phthalic anhydride when using *o*-xylene as raw material, naphthalene at even a high price is still favoured. So importers search the world for this product. Any industrial country is a producer, but at the present time an overall shortage prevails. Those who have looked to the U.S.S.R. for supplies—among them Montecatini of Italy—have found supplies, to their dismay, erratic. The growing industrial development in India, however, may provide useful supplies, as, for instance, the new Durgapur steelworks.

NEW AMINO ACID

A NEW acidic aromatic amino acid (meta-carboxy-α-phenylglycine) has been isolated from the non-protein fraction in bulbs of *Iris tingitana*. This was done by research workers of the United States Department of Agriculture at the U.S. Plant, Soil and Nutrition laboratory, Ithaca, N.Y., and Beltsville, Maryland.

The acid was isolated in pure form and its structure determined by breaking it down to known compounds. Comparisons were made by elemental analysis, melting point, and infra red absorption. The new acid was also synthesised and compared similarly with isolated material.

This is the first acidic aromatic amino acid isolated from natural material. Quantitative paper chromatography has shown that it accounts for an appreciable portion of the non-protein nitrogen of iris bulbs. The new acid's role in plant and/or animal metabolism is as yet unknown.

Project News

Chemico's Expanded Vanadium Catalyst Facilities at Slough

TO cope with increased orders for their vanadium pentoxide catalyst Chemical Construction (G.B.) Ltd. have expanded their factory facilities at Slough. Chemico manufacture their own catalyst for sulphuric acid plants which until recently had been restricted to purchasers of Chemico acid plants. Due to current demand for this catalyst Chemico have now made it freely available.

The 192 Chemico-built contact sulphuric acid plants which together produce over 8 million tons of sulphuric acid a year use this vanadium pentoxide-based catalyst.

● For the nuclear power station to be built in North Wales for the Central Electricity Generating Board by the Atomic Power Construction Group, the heat exchanger glandless circulating pumps are to be supplied by Hayward, Tyler and Co., under a contract placed by International Combustion Ltd.

● Recently, complete furnishings, worth over £4,000, for the new clinical laboratory of the Stichting Klinish Chemisch Laboratorium, Rotterdam, Holland, were flown, in knocked-down form, with the minimum of packaging, in one K.L.M. aircraft to Amsterdam Airport, from London Airport.

The steel benches, fume-cupboards, etc., weighed over 5 tons in all, and were manufactured by Griffin-Grundy, Ltd., a subsidiary of Griffin and George Ltd., Alperton, Wembley, Middlesex.

● Associated Electrical Industries' heavy plant division has received an order for germanium rectifiers for a smelter at Bell Bay, Tasmania, owned by the Australian Aluminium Production Commission. The order, worth more than £400,000, is for equipment with an installed capacity of 42 mW for an extension to the smelter. The plant will be commissioned in 1961.

● Chemical Engineering Division of W. C. Holmes and Co. Ltd., Huddersfield, have received an order of approximate value of £31,000 for the installation of a complete briquetting plant at the Kingston-on-Thames 'B' power station of the Central Electricity Generating Board.

This plant has been designed in collaboration with Neldco Processes Ltd. and Conreur Ledent et Cie, of Raismes, France, who will supply the press. The plant will produce 10 tons of ovoids an hour, using grit taken from the station's gas collection systems, mixed with fine coal. Liquid pitch will be used as the binder.

The new plant is scheduled to be in operation before the end of the year.

I.C.I.'s Expansion Rate will be Equal to that Since 1949

WHAT sort of future for I.C.I. is foreseen by new chairman, Mr. Paul Chambers, who has this week taken over from Sir Alexander Fleck? In the next 10 years he sees I.C.I. expanding on a broad front. "Expansion will be at a rate at least equal to that achieved since the war." In saying "at least equal" Mr. Chambers qualifies this by adding that he is thinking in terms of real values.

Between 1949 and 1959 I.C.I.'s profits soared from £17 million to £55 million although in 1958 they slipped back to £44 million. For last year, however, the indications are that a new record will be shown. Results will be announced on 24 March.

Asked about dividend policy, Mr. Chambers recalled that he was once I.C.I.'s finance director, so that he had a special hand in shaping it. He likes to think, he says, that I.C.I.'s dividend policy is one of progressive stability.

Trade, generally, I.C.I.'s new chairman believes, is going ahead "extremely well". For many products, he indicates, this country is ahead of its overseas rivals on quality, price and technical know-how. "Britain's selling methods are vigorous, too. If we can keep on an even keel, monetarily speaking, this country is well placed for a substantial expansion in exports."

Mr. Chambers warns that costs need watching carefully after the rise in railway wages. The economy could easily topple backwards into an inflationary condition, if wages were similarly raised throughout industry with no accompanying increase in productivity. It would be a mistake, he suggests, to bring back the

Mr. Paul Chambers, I.C.I.'s new chairman

credit squeeze. "If the Chancellor starts to contract the economy in his Budget, it will do more harm than good. Capital expenditure in private manufacturing must be encouraged to give us extra productivity and still bigger competitive power overseas." A "standstill" Budget is recommended by Mr. Chambers, and whatever tax reliefs are given should be balanced by extra taxation of another kind.

Acute Shortage of Natural Rubber Emphasises Need for the Synthetics

LAST year, the rubber industry faced the most acute shortage of supplies of natural rubber for 50 years. This was stated by Mr. G F. McIvor, chairman of the Rubber Trade Association, at the annual general meeting.

Consumption of natural rubber first exceeded a figure of 100,000 tons in 1910, 250,000 tons in 1919, 500,000 tons in 1925, 1 million tons in 1936, 1.5 million tons in 1950 and 2 million tons in 1959. In this last year, the synthetic rubber industry provided the 1.6 million tons required to satisfy consumer needs.

Both natural and synthetic production has been expanded by fortuitous circumstances. Only in the U.S. in the early years after the war was there any significant production of synthetic rubber. Now every major consuming country is ensuring its own synthetic supplies.

Consumption of Synthetic Rubber

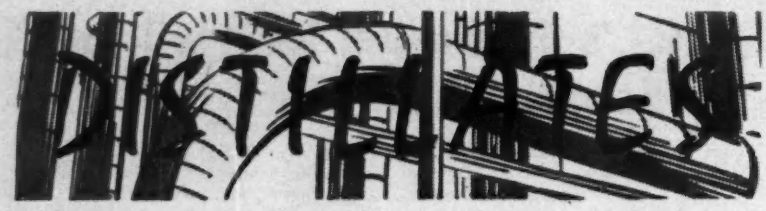
Year	U.S.	Other countries	Total
1948 ...	442,000	38,000	480,000
1951 ...	759,000	53,500	872,500
1954 ...	636,000	104,000	740,000
1957 ...	926,000	331,500	1,257,500
1959 ... (Est.)	1,060,000	467,000	1,527,000

Only by implementation of the British Government decisions to liquidate its stockpile and by the U.S. Government reducing its stockpile has a crisis been averted. These decisions have allowed 27,000 tons from the British and 29,160 tons of so-called "deterioration" rubber from the U.S. stockpile to be absorbed in 3½ months with a comparatively small effect on prices.

The natural rubber industry has to expect a very active sales programme from the manufacturers of synthetics and it is therefore preparing to take steps to counter some of the "extravagant claims" that are being made, Mr. McIvor declares.

Current estimates make it reasonable to believe that the supply of natural rubber can be raised to 2.4 million tons by 1965—not a very high percentage increase. West African countries are expected to make an increasing contribution to this expansion.

If estimates for the increasing demand for all rubbers in the next five to 10 years can be believed stockpile releases may only be giving a comparatively temporary breathing space, in providing the adequate supply of natural rubber, the Rubber Trade Association believes. Expansion of consumer demand, it would appear, can only be satisfied by further increases of synthetic production but Mr. McIvor suggests that the increase in the output of synthetic rubbers may be limited from time to time, as it is at the moment, by shortages of constituent materials, notably butadiene.



★ WITH the acquisition from W. and H. M. Goulding Ltd. of a 51% holding in Richardson's Chemical Manure Co. Ltd. and Ulster Manure Co. Ltd., who supply most of the fertiliser requirements of Northern Ireland (see CHEMICAL AGE last week, p. 361). I.C.I.'s Billingham Division have fulfilled an interest going back some four years or more.

Richardson's were the subject of an article in *The Billingham Post* four years ago when their use of Billingham's sulphate of ammonia in compounding complete fertilisers was described. At that time they were using about 15,000 tons of sulphate a year, most of which came from Billingham's Prudhoe factory.

Since 1957, I recall, Richardson's have with the help of the Northern Ireland Ministry of Finance spent more than £500,000 on modernising and expanding their Belfast factory to increase output. About that time they brought into operation a new sulphuric acid plant which was the largest of its kind in Ireland using pyrites and spent oxide as the new materials to give an annual output of 21,000 tons of acid a year. They also operate new superphosphate and granulating plants.

★ THE announcement made last week by the organisers of the Laboratory Apparatus and Materials Exhibition to the effect that only eight stands were then still available contains a reminder of the ever-growing number of industries engaged in research; and a glance at the list of the industries provides a further reminder, that perhaps without exception, the chemical manufacturing industry is closely associated with such research.

This will be the first-ever national show exclusively devoted to laboratory supplies. Scheduled to open the New Hall of the Royal Horticultural Society, Westminster, London, on 20 June, I hope that by the time it closes four days later it will have established itself firmly as part of the annual-exhibition scenery.

★ ROAD transport of chemicals is certainly advancing in a big way. From the Continent, and Holland in particular, comes news of modern tank cars and fleets of stainless steel tank vehicles for bulk shipment. Du Pont de Nemours International SA (see p. 410) have set up bulk storage and delivery facilities in Rotterdam for dimethyl formaldehyde (DMF) and dimethylamine (DMA), and the C. Ind. U., (Chemical Industry of Uithoorn) situated some 12 miles south of Amsterdam have a subsidiary whose function it is to provide the parent concern with transport and allied technical facilities. The N.V. Nederlandse Wegensproei Maatschappij known as N.W.M., is a large concern with some 60 motorised units and nearly as many trailers.

Until recently, German vehicles formed the majority of the fleet, but I understand that Leyland vehicles form a steadily growing proportion of the total. A wide range of C. Ind. U. chemicals is carried by Leylands' Super Hippo six-wheeled rigid vehicles. These are mounted either with 9,000-litre stainless steel tanks and haul 10,000-litre stainless steel two-axled trailer tankers, or with 12,000-litre plastics-coated steel tanks and pull tank-trailers of similar capacity.

These Leylands operate frequently in Belgium, France and Germany, as well as all over Holland, the farthest point normally served being the South of France, 1,000 miles away. Each of the bulk delivery vehicles averages 80,000-100,000 kilometres a year.

Additional Super Hippos will be similarly employed when they come into service. These will have 12,500-litre stainless steel tanks and will run regularly with 12,500-litre two-axled trailer tankers.

Super Beaver tractors are on order. One will haul a 21,000-litre stainless steel semi-trailer tank carrying chemicals. Another with a 25,000-litre tank semi-trailer equipped with a blower is employed on transporting different kinds of powders and is engaged on a regular run to a point in Germany 350 miles away from Eindhoven.

★ CONVEYING to the public what science means is among the professed aims of the tercentenary celebrations of the Royal Society (as described by Sir Cyril Hinshelwood, the society's chairman, speaking at a recent press conference at which the celebrations were discussed in detail and it also appears to be aback of the Griffin and George-sponsored competition currently being organised by *Teaching Science*, 5 Great James Street, London W.C.1. Few would deny the acute necessity for such enlightenment in an age when specialisation tends more and more to sever the public-at-large from really useful information about what is actually taking place in the laboratories and elsewhere, behind 'locked' doors.

The competition is open to science teachers of secondary schools up to O-level G.E.C., and primary schools, who are invited to compete for small cash awards which should also carry a good deal of prestige. These are to be made by an independent committee which includes the principal of a training college and a borough director of education, and entries must be concerned with presentation of a new idea, or new development of an old one.

If both these events in their respective contexts can be taken as indication of growing awareness that hard after scientific progress comes the problem of dissemination of knowledge, it is a hopeful sign.

★ THOSE combustible-chemical manufactures not already so equipped might do worse than perusé the lively bulletin issued by Nu-Swift Ltd. of Elland, Yorks, entitled 'The first five minutes—It is your fire', which describes some of the seemingly incredible performances of the company's sodium bicarbonate extinguishers. Nu-Swift claim that the 'chain reaction' by which a fire progresses is inhibited by this material (90% $NaHCO_3$ and 10% a 'secret formula' chiefly designed to prevent coagulation) which acts as a negative catalyst and also absorbs heat radiation.

One test which particularly impressed me was the extinguishing, in the brief spell of only 2.5 seconds, of a 14-foot square metal tray containing eight gallons of blazing petrol which was allowed to burn half a minute before the extinguisher was applied. Split-second 'kills' have also been performed under test on burning propane gas; white spirit and diesel oil, etc.

★ ALL the packaging tests laid down in the Government specification DEF 1234 for full and restricted standard packages up to 500 lb. in weight can now be carried out by Patra (Printing, Packaging and Allied Trades Research Association). This has been made possible by the completion of humidity rooms which enable packs to be stored under various climatic conditions.

The rooms have been constructed from resin-bonded glass fibre which is thermally insulated by glass fibre slabs. The temperature and humidity control equipment has been made at Patra. Preliminary studies show a very accurate control of temperature and humidity, the variation in temperature at any one point being ±0.2°F, while humidity variation is of the order of ±0.75%.

★ EVERY week the CHEMICAL AGE enquiry department deals with dozens of enquiries, ranging from the chemical structure of products, to process techniques, sources of supply and prices. But on Monday came an enquiry that disturbed the relative calm and equilibrium of an enquiry staff that normally takes the unusual in its stride.

The enquirer sought a cube of carbon dioxide ice weighing about 1 lb. So far so good, but it was wanted for a pyjama party being held the same evening 'to make the drinks fizz.' I gather that a sales department of a well-known chemical company was asked to deliver the consignment from their West London depot!

Alembic

CONTINUOUS GLASS-MAKING & ORE PROCESSING AT MULLARD'S PLANT

PROCESSING of natural ores, production of glass and wire may not at first be connected rationally with Mullard Ltd. Yet before wire-making processes begin, several ores are processed while in the production of valves, for 24 hours a day, year in year out 14,000 miles of glass tubing are produced by the company's glass-making unit. Between them, too, the Mullard plants in Lancashire used about 1.8 million therms (400,000,000 cu. ft.) of town gas a year.

Manufacturing plants of the Mullard group are located in two main regions —in the north and south of England. Concentrated in Lancashire are plants at Blackburn, Simonstone (near Burnley) and Southport, with smaller feeder factories in Fleetwood, Rawtenstall, Lytham St. Annes and Southport. Established shortly before the Second World War, the Blackburn plant is responsible for most of the Mullard's production of radio and television valves, turning out about a million a week. Large sections of this plant are devoted to making fine wire, glass and components. Much of the glass and wire is absorbed by the valve manufacturing units of the plant; but substantial quantities of tungsten and molybdenum wire are supplied to other industries while glass tubing is used in other plants of the group as for example, in the form of necks for television tubes. Yearly production of glass tubing amounts to over 14,000 miles.

On-the-Spot Manufacture

Apart from the mica spacers and the nickel used for some electrodes, all the components for the many different types of valves produced by Mullard are made within the Blackburn plant from the raw materials.

Basic components of a valve are: the electrodes, comprising heater, cathode, anode and excepting diodes, one or more grids; the glass envelope and base; the internal supporting members, mica spacers and insulators. The various components are fabricated in separate units in the plant and brought together in large assembly bays.

Cathode of the valve consists of a central core of nickel tube, round which the emissive coating is sprayed. Nickel tubing is re-drawn in the plant's wire drawing unit to the very small dimensions required, i.e., only 0.75 mm. by 0.65 mm. with a wall thickness of 0.05 mm. The emissive coating, a mixture of barium and strontium carbonates in a volatile solvent, is sprayed on under careful control to ensure a coating of uniform density and thickness. Inside the central tube of the cathode is the heater or filament—a spiral of very fine tungsten and coated with aluminium oxide to insulate it electrically from the cathode. Grids of the valves are essentially flattened spirals of very fine molybdenum wire. Anodes are of nickel, nickel-plated steel or aluminised steel depending on the type of valve.

Making glass at Blackburn. The glass-making unit at Mullard's Blackburn plant is virtually a factory in its own right. Most of this is absorbed by the plant's valve-making units, but a significant proportion is worked into envelopes for the millions of semiconductor devices made annually in the company's southern production centres and into necks for the television tubes made at the nearby Simonstone plant.

Clear, faultless lead glass is a must for valve, tube and transistor manufacture, so to basic ingredients of red lead, sand and sodium and potassium carbonates are added carefully selected chemicals to improve the quality of the finished product and water ingredients are weighed into hoppers and automatically mixed. Then the hoppers are marshalled above the furnaces ready for their loads to be fed in the glass-melting tanks—maintained at 1,500°C.

Automatic Glass-Making

Liquid glass is poured automatically into a gas-heated holding and feeding furnace which contains rotating tube-forming machines. From these machines the glass is drawn vertically in tubular form. In the centre of each machine is an inverted cone through which air is blown at low pressure. Molten glass runs round the cone and is drawn straight up from the centre, forming a tube round the upward jet of air. By adjusting the cone size and the air pressure the inside diameter of the tubing can be varied accurately to particular requirements from, for example, 1.5 mm. for transistor envelopes to 50 mm. for television tube necks.

As the newly-formed tubing rises it passes through a circle of air jets which keep it perfectly round and control the thickness of the tube wall. Twenty-five feet above the furnace floor, the tubing is gripped and drawn up as an endless column of hot glass. Operators cut the tubing into suitable lengths as it rises and weigh each piece. Diameter of each length is checked and wall thickness by micrometer.

Production of glass-tubing is continuous at Blackburn going on night and day, year in year out. Essential to the operation of the furnaces is a reliable supply of gas at the right pressure.

From Ore to Wire. Annual output of tungsten and molybdenum wire at Blackburn is stated to exceed 250,000 miles. The finest wire produced has a diameter of 5-thousandths of a millimetre. In production of tungsten the raw material used is scheelite and molybdenum is obtained from molybdenite ore.

Scheelite ore is chemically tested to ensure its quality and then ground in a ball mill for several days. The fine tungsten oxide powder is purified chemically, and placed in reducing furnaces (in an atmosphere of hydrogen) for conversion to tungsten metal powder at 900°C. To control crystal structure chemical additives are introduced into the pure powder.

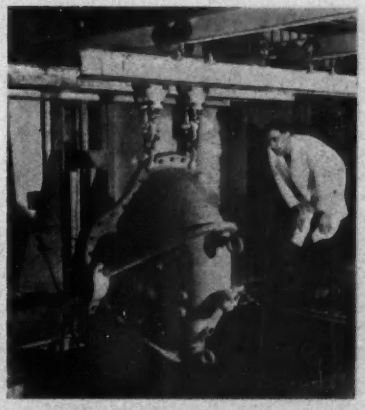
Sintering processes crystallise the compressed powder into metal bars ready for drawing into wire. This is accomplished by first heating the bars in an atmosphere of hydrogen and then passing through them an electric current of between 2,000 and 3,000 amps.

After formation of the bars into rods, the tungsten rods are drawn through dies until the thickness required is obtained. Production of molybdenum follows a broadly similar pattern.

Dip Coating of Heavy Metal Parts with P.V.C.

THE 4½-ton casing of a pump supplying main salt-water delivery for Esso's Fawley refinery is thought to be the heaviest piece of machinery ever plastics-coated by a dipping process, state British Geon Ltd., Devonshire House, Piccadilly, London W.1, suppliers of a p.v.c. on which the dipping material was based.

The work was carried out by Durable Plastics Ltd., Guildford, Surrey, the pump-casing being treated in two sections, each given an experimental p.v.c. coating to a thickness of 3/16 in. The casing was formerly spray-lined with neoprene rubber, and by using the dipping process in place of multi-coat neoprene, costs are said to have been approximately halved.



Pump casing being lowered into a tank containing a paste based on British Geon p.v.c. Dipping was carried out by Durable Plastics Ltd.

Reagents' Service

A leaflet describing chemicals for research and analysis, and the company's service to scientific workers and others, is available from Hopkin and Williams Ltd., Chadwell Heath, Essex.

FLECK'S FIFTY YEARS DEVOTED

'Chemical Age' congratulates Sir Alexander Fleck, retiring chairman of I.C.I. with a pictorial survey of his life

ON 1 March, Sir Alexander Fleck retired as chairman of Imperial Chemical Industries Ltd., undoubtedly one of the largest industrial empires in the world. He became chairman seven years ago in June 1953.

Like his two immediate predecessors, Lord McGowan and Mr. John Rogers, who were also Glasgow men, Sir Alexander started at the bottom as a laboratory boy.

Born in Glasgow in 1889, a coal merchant's son, Sir Alexander started his working life as a laboratory boy at Glasgow University, and when Frederick Soddy, then 27, arrived as lecturer, Fleck joined him. At 16 he was attending evening classes and later became a student and then a post-graduate research worker at the university. Then 22, he was appointed to the university teaching staff as an assistant in the Physical Chemistry Department and did some work under Soddy, which showed him to be a first-class scientist.

When Glasgow University gave him an honorary LL.D. in June 1953, the Regius Professor of Materia Medica declared that Fleck's findings "laid the foundation for Soddy's alpha and beta ray periodic tables and anticipated—in the best traditions of scientific progress—Mosely's spectacular researches which led to the conception of atomic numbers".

By 1913 he had his own research laboratory as physical chemist to the Glasgow and West of Scotland Radium Committee, where he was concerned with radiological research on cancer. His original doctorate came from his thesis called 'Some Chapters on the Chemistry of the Radio Elements.'

It was the First World War that drew Sir Alexander into the Castner-Kellner Alkali Co. Ltd., which in 1920 became a subsidiary company of Brunner, Mond and Co. Ltd. When the war ended, Fleck had acquired experience and reputation enough to be made works manager of the company's factory at Wallsend. The I.C.I. merger in 1926 gave his talents wider scope and by 1931 he had risen to be managing director of I.C.I.'s General Chemicals Division. The chairmanship of Billingham, then I.C.I. (Fertiliser and Synthetic Products) Ltd., followed in 1937.

In 1944 Sir Alexander joined I.C.I.'s main board as director responsible for the Billingham Division and also for Central Agricultural Control. Wilton—I.C.I.'s newest and most revolutionary development—became his responsibility in 1946. From 1951 until his appointment as chairman he was one of the company's deputy chairmen.

Wide recognition has been given to Sir Alexander's contributions to science as well as industry. In the same year as he received the honorary LL.D. from his Alma Mater, Glasgow University, he received an honorary D.Sc. from Durham University, with which he has close connections, followed in 1956 by Oxford University and, in November 1957, by London University. In this same month he was made an Honorary Fellow of the Manchester College of Science and Technology and a year later two more honorary degrees—in May, a D.Sc. from Nottingham University and, in October, an Sc.D. at Dublin were conferred.

Further recognition was given to Sir Alexander's scientific work when in 1955 he was elected a Fellow of the Royal Society. A year later he received the Messel Medal, the Society of Chemical Industry's highest award. In 1957, the Royal Society of Edinburgh elected him to an Honorary Fellowship of the Royal Faculty of Physicians and Surgeons of Glasgow. He is also a trustee of the new Churchill College at Cambridge.

Perhaps Sir Alexander's greatest claim to fame came with the 'Fleck Report,' which reviewed the organisation of the coal industry and was published in 1955. In June of that year he received the K.B.E. in the Birthday Honours list "for services to the Ministry of Fuel and Power."

In November 1957 he was made chairman of the three committees charged with the investigation of the accident at the Windscale establishment of the United Kingdom Atomic Energy Authority. Shortly afterwards he was appointed to the chairmanship of a committee nominated by the Government to inquire into the British Fishing Industry. In September 1958, the Minister of Power appointed Sir Alexander as chairman of his Scientific Advisory Council, which was set up in 1948 to advise the Minister on the scientific aspects of his statutory duties.

At home Sir Alexander enjoys a simple life. He likes walking, is keen on gardening and motor yachting, and one of his pet interests recently has been the newly discovered potash deposits in Yorkshire. In the last few years he has campaigned to promote the importance of technology and the need for technologists. Under his encouragement have grown up industrial preparatory schools for 15-year-old apprentices, and I.C.I. Transfer Scholarships and within the last few weeks he has led an appeal to British industry to donate £100,000 to establish a staff college for senior teachers in colleges of technology and senior industrial executives, and so ensure an adequate supply of key personnel for the teaching colleges.

But Sir Alexander is keen that science should not mean a narrowing of interests, and he believes that this country's future prosperity depends on the unity of arts and science.

When Fleck became chairman of I.C.I. seven years ago, the newspapers dubbed him "The Quiet man". When viewed against the big business tycoons of latter years, Sir Alexander appears as a scientist of quiet and steady temperament. He is a brilliant man but also a reasonable one, while his commercial sense has led I.C.I. to even greater heights in the last few years than that company could have believed possible.

Since 1953, Sir Alexander has travelled the world in I.C.I.'s interests. He has directed with a sure hand the company's expansion and consolidation and the plan for a second 'Wilton' at Severnside is now well under way. What better monument than this could there be for Sir Alexander.

Sir Alexander receives his award for 40 years' service from Mr. S. P. Chambers who became the new I.C.I. chairman on 1 March

TO SCIENCE AND INDUSTRY

Earliest photograph on I.C.I. files: Sir Alexander, then works manager at Wallsend factory, with works councillors

With Sir Edmund Hillary (1953)

The late King George VI and Queen Elizabeth visit the Billingham factory (left). At Jealot's Hill research station for the visit of H.R.H. the Duke of Edinburgh. Chopsticks lesson for SirAlexander: Tokyo, April 1958. Delhi, India: Greeted by Nehru when attending the Science Congress, 1959

Sir Alexander chats with Governor of Victoria at official opening of ICIANZ's skyscraper H.Q. in Melbourne (December 1958)

With the Queen Mother at London University where he received the honorary degree of Doctor of Science; November 1957. Right: H.M. Queen Elizabeth at Wilton during a tour of the North East; June 1959

Phenol Hearing

JUDGEMENT RESERVED IN PHENOL PRICES CASE

GIVING evidence for the Registrar of Restrictive Trading Agreements on the eighth day of the case of the fixed price agreement of the Phenol Producers' Association, (see also CHEMICAL AGE, 20 February, p. 322, and 27 February, p. 357), Dr. Alfred Parker, a chemical engineering consultant, told the Restrictive Practices Court that tar and fuel oil had an equally good heat-producing quality and there was a potential market for tar in steel production.

During cross-examination by Mr. B. J. M. MacKenna, Q.C. for the association, Dr. Parker agreed that a number of the large steel works already used tar as a fuel. He did not know what was the corrosive effect on the boilers, and he suggested it would take 10 years to make a test.

In reply to a question about the increased production of phenol between 1956 and 1958, Dr. Parker agreed that he was surprised that in the face of a rising demand, large stocks of phenol were kept.

When Mr. D. G. Davis, manager of the organisation and methods department of Shell Chemicals gave evidence, the question of whether the terms of a contract for the supply of phenol by British Hydrocarbon Chemicals to Shell Chemicals should be disclosed to the association was raised. Mr. Davis said Shell Chemicals were supplied with phenol by I.C.I. from 1956 until 10 January 1960, when the agreement expired. The price varied between £141 and £143 a ton. His company, he said, was now taking deliveries under an agreement with British Hydrocarbon Chemicals Ltd. The price, he indicated, was "substantially below that paid under the agreement with Imperial Chemical Industries Ltd.

Uses and Costs

Uses for phenol were indicated by Mr. Davis. These included its use in the manufacture of lubricating oil, resins for paints and electrical components, and in detergents. Phenol delivered to Shell Chemicals was for their own use in the U.K.

Evidence on costings was given by Mr. J. D. Russell, a chartered accountant. He said there was considerable variation in works costs, costs of raw materials and works profits. The main variation was due not only to the efficiency of the people operating the plant but the plant itself. Various methods of refining were expected to give variations in costs.

Mr. Russell, during Mr. MacKenna's cross-examination, said he was not suggesting that excessive profits were being made on phenol, but there was an element of protection for the high cost producer.

During the eighth day of the hearing, the difficulties faced by plastics moulding powder manufacturers in overseas markets and their efforts to obtain a reduction in the price of phenol, were described.

Speaking for powder manufacturers, Mr. William Martin, commercial director of James Ferguson and Sons, said that they desired to be able to negotiate the price of phenol on an open market. "We don't think we could be any worse off. In view of the tonnage we have to offer we think we could very well secure an advantageous price."

Details of negotiations between phenol users and manufacturers when efforts were made by users to secure a reduction in the price of phenol used for exported moulding powders were then discussed. Mr. Martin informed the court that the powder manufacturers' efforts for a reduction were unsuccessful and as far as he knew no further approach had been made to the phenol producers.

Long-Term Contracts

Mr. Clifford Thomas, an economist, said in evidence that if the agreement were abrogated there would undoubtedly be competition, but it would be competition blunted by long-term contracts in which concerns in the chemical industry liked to participate. "I think the degree of competition will not be as great as the association envisages."

During questioning by Mr. T. G. Roche, Q.C., for the Registrar of Restrictive Trading Agreements, on the repercussions likely to follow the freeing of the phenol market, Mr. Thomas said that such a move would not be detrimental to the public interest for "it will enable the person who really requires a particular substance to be provided with it".

Mr. Roche: "Are the price restrictions necessary to ensure the public's supply of phenol?"

Mr. Thomas: "I think this control does nothing to ensure to the public its supply of phenol."

Asked by Mr. Roche if the liberty to operate the price ring was removed, could he see that that fact would cause any shortage of phenol in the future, Mr. Thomas indicated that he could see none at all. If phenol was required, it would be made.

During cross-examination by Mr. Mackenna, Mr. Thomas said he knew of no organisation which had had to close down its plant temporarily in the manner he had suggested, neither did he know of any instance where they had kept in production and not covered direct costs.

The Phenol Producers' Association fixed price agreement had resulted in a stable price for phenol—but only when the tide was flowing in the consumer's favour. This was stated by Mr. Roche during his final submission for the Registrar of Restrictive Trading Agreements on tenth day of the hearing.

The Registrar did not accept, Mr. Roche said, that there had been perfect stability in the past or that there would be stability in the future. (The Restrictive Practices Court has to decide whether or not the agreement is in the public interest). The system now under consideration was a bad one for the persons in question were "particularly unfit to fix the price of phenol." The agreement was not merely of no benefit, but was positively detrimental to the user of phenol, Mr. Roche stated.

Making his final submissions on behalf of the association, Mr. MacKenna stated that although their collective caution had not been based on any costing system, members had not 'exceeded the limits' in fixing the price of phenol. He submitted that the agreement had maintained stable prices and that the level of those prices had been reasonable and while it had been in force there had been great expansion in the production of synthetic resins and plasticisers, of which phenol, cresylic acid and naphthalene were essential ingredients.

"If you declare our agreement void, you will jeopardise what we have already achieved", Mr. MacKenna declared.

Rises in the price of phenol were then outlined by him and he submitted that they were not out of line with the rises in costs of labour and materials in industry generally during the same periods. "On the contrary the rise in price seems to be less than one would expect, having regard to the change in costs of all other commodities", Mr. MacKenna commented.

With regard to the Registrar's assertion that the price of phenol in the U.S. and Germany compared unfavourably with the U.K. price, Mr. MacKenna stated that U.S. production was almost entirely synthetic. He added "The Registrar does not prove that the price is too high by proving that a price is lower somewhere else".

Reference was made by Mr. MacKenna to the argument advanced by Mr. Roche that extra profit earned from naphthalene could make good the reduced profits from phenol and other products if the agreement came to an end. He described this argument as "far reaching" and said that it would require an enormous addition to the price of naphthalene to make good the anticipated losses. One of the association's witnesses, he reminded the court, had spoken of a possible increase of £20 a ton for naphthalene, but there was no reason for thinking that the producers could impose such an increase on their customers.

"If you accept that there will be a decline in the distillation of tar, we say that there is bound to be a loss on home produced naphthalene and all the required products of crude tar acid," Mr. MacKenna stated. "The loss of natural

(*Continued in p.* 415)

AROCLORS PROVIDE POLYESTERS AND EPOXY RESINS WITH FIRE-RESISTANCE AND STRENGTH

POLYESTER glass-fibre laminates are now widely used. In some applications, however, certain inherent characteristics require modification, in particular, fire resistance and mechanical properties. For both purposes, Monsanto Chemicals Ltd. suggest the Aroclors as being suitable to impart these properties.

The Aroclors are a range of chlorinated diphenyls and polyphenyls, three of which Monsanto state have proved to be economical and efficient as dual-purpose fire-retardants and plasticisers. By virtue of their high content of available chlorine they impart adequate self-extinguishing properties, while their plasticising powers increase the strength of the resin to a degree equal, it is claimed, to that gained by a more expensive plasticising polyester.

Miscibility with Polyesters. The recommended Aroclors are readily miscible with uncured polyesters at the concentrations necessary to impart fire resistance. Solid members dissolve more easily at 60°C. Once mixed they have no tendency to separate on standing nor to migrate to the surface of the cured resin. The Aroclors also have the advantage of being practically odourless. They may be used to similar effect in epoxy resins as well as polyesters.

Use of Solid Aroclors. The Aroclors recommended as fire retardants are a soft sticky resin, Aroclor 1260 and the hard brittle resins, Aroclors 4465 and 5460. These compounds are more highly chlorinated and less volatile than the mobile liquids, and both these properties are found to improve their efficiency as fire retardants.

Synergism with Antimony Trioxide

Generally the Aroclors are used in combination with antimony trioxide, also a fire retardant. Combination is stated to be particularly effective as the two substances are synergistic, together giving a degree of fire resistance which is adequate for most possible uses. Self-extinguishing properties to the resin are imparted by Aroclor while antimony trioxide reduces afterglow and also plays the part of an inert filter, replacing a portion of whichever filter is being used.

Flame-retardance. Evaluation of the Aroclors as fire-retardants was carried out in a series of laboratory tests using a general purpose polyester with a 35% styrene content. The catalyst used was 2% of a 60% solution of methyl ethyl ketone peroxide in dibutyl phthalate, added after the Aroclor. Cobalt naphthenate (2% of a 1% solution) was used as an accelerator. The test method used was that based on the Ministry of Supply Aircraft Specification for unsaturated polyester resins DTD5537 Appendix 10. Flame was applied to the resin and at the end of 30 seconds, removed. If burning did not continue, the flame was replaced for a further 30 seconds immediately it ceased, and if the specimen again failed to continue burning the material was classed as self-extinguishing.

Plasticising Properties. With regard to the effect of Aroclors on physical properties of resins, Monsanto have found that at a concentration of 10% (enough for purposes of fire-retardance) none of the Aroclors reduced flexural strength of the cured resin significantly. Their effect, in fact, was comparable with that of a plasticising polyester. At a concentration of 20%, impact strength of the laminate is improved. For purposes of lamination Aroclor 1260 is recommended as it reduces the flexual strength less than the solid Aroclors. Solid Aroclors are stated to be preferable for fire-resistant surface coatings.

Used with Epoxy Resins. With the epoxy resins Aroclors are completely miscible, Aroclors 4465 and 5460 dissolving fairly readily at 60°C. Some diminution of the characteristic mechanical properties of epoxies occurs but careful formulation will allow a balance, between fire-resistance and strength for applications where the former property is essential, to be struck. Antimony trioxide in the same concentration as the Aroclor is used.

Precautions. Non-oxidising and non-corrosive, the Aroclors are not hydrolysed by water, alkalis or acids. While at ordinary temperatures they present no industrial toxicological problems, nevertheless these compounds should be handled with care and should not be allowed to come into contact with the skin, through which they are absorbed. If a burn should occur, it should be treated in the same way as an ordinary burn. Experimental work with animals has indicated a maximum safe concentration of vapours in workrooms in the range of 0.5 to 1.0 mg./cu. m. of air.

German Calcium Cyanamide Process Uses Finer CaC_2 Feed

FOLLOWING the successful start-up by Sueddeutsche Kalkstickstoff-Werke AG, Trostberg, Bavaria, Germany, of a 48-tons/day (24% fixed N) rotating-furnace process, the company is shortly to have another 104-tons/day process that combines the rotating furnace with a preliminary fluidised-bed reaction step. Details of the latter have yet to be released.

The process at Sueddeutsche is an exothermic nitrogenation of calcium carbide, but utilises a finely powdered carbide feed of less than 0.2 mm. particle size. As the nitrogenation is a surface reaction, process efficiency is inversely proportional to particle size. Economically the process is stated to be very favourable. Also, in the process, some calcium cyanamide product is recycled to the feed stream, thus stopping sintering and preventing reversal of the nitrogenation reaction.

Developed in co-operation with Maschinenfabrik Fellner and Ziegler of Frankfurt, the Sueddeutsche furnace rotates on a horizontal axis. Compared with a rotary kiln, the furnace is noticeably smaller and its front end is enlarged to form a reaction chamber of 8 ft. inner diameter and 10 ft. in length.

Pulverised feed mixture of carbide, calcium cyanamide and fluospar blows into the head of the furnace, suspended in a stream of nitrogen. Nitrogenation is stated to occur within the first 10 ft. of travel only at around 1,930°F to 2,120°F; and these temperatures are maintained by the reaction.

As the product passes out of the furnace, it falls into a cooling shaft leading to a cooling drum, where product temperature falls to 127°F. The calcium cyanamide produced, contaminated with carbon and mineral impurities, is stated to be fine grained and to require no further crushing. Nitrogen content is 24% and carbide content about 0.03 to 0.5%. The proportion of recycle cyanamide in the feed stream is stated to depend on the quality of feed carbide. Fluospar, comprising about 2% of the feed, acts as a flux to lower reaction temperature without affecting rate.

Rotary Kiln vs Sueddeutsche Process
(Basis: 1 ton fixed N in CaCN product)

	Com. Rotary Kiln	Sueddeutsche Process
Particle size	0.3—2.0	0.2
CaC_2, tons	3.16	2.92
Nitrogen cu. ft. ...	163	100
Fluospar, lb.	61,000	43,400
Power input kWh ...	318	227
Labour, man/hr. ...	12.7	1.8

Pure Food Centenary

Arrangements are already well in hand for the Centenary Exhibition at Charing Cross, London, underground station, which will be opened next September by Rt. Hon. John Hare, Minister of Agriculture, to mark the part played by legislation and by science and technology in achieving purity in the food industry. Papers will be presented each morning of the conference at the Royal Institution. Further particulars may be obtained from the Secretariat, The Pure Food Centenary, 14 Belgrave Square, London S.W.1.

Glass Containers Record

Sales of glass bottles and jars for 1959 reached a record level of 4,157 million units, an increase of 43.5% over the past ten years, state the Glass Manufacturers' Federation, 19 Portland Place, London W.1.

In Parliament

Analysis of Arsenic-sprayed Potatoes Showed no Danger to Public Health

WHERE arsenic is found in potatoes, peel normally contains more arsenic than the flesh; but surveys organised by the Ministry of Health in 1958 and analysis of samples of tubers from sprayed crops taken by the National Agricultural Advisory Service in 1959 have indicated that the residues would not be dangerous to public health. Moreover there are stringent statutory limits to the amount of arsenic which may be in any food including home grown and imported potatoes as sold. This was stated in the House by Mr. John Hare, Minister of Agriculture, in reply to a question last week.

Note. The Arsenic in Food Regulations, 1959 (831), paragraph 3(1), require that ". . . save as hereinafter provided no food shall contain arsenic in proportions exceeding one part per million (estimated by weight of such food)". This paragraph applies to home grown and imported potatoes. Samples taken by the N.A.A.S. in 1959 showed no case where the residue of arsenic in whole potatoes reached 1 p.p.m. These samples were taken in the South Eastern, Eastern, South Western and Yorks and Lancs Regions. Samples included potato from plots treated with arsenite haulm killers.

Weights and Measures Bill Delayed

There will be no time for introduction of the Bill to amend the law on weights and measures during the present session which ends in October, said Mr. Rogers, Parliamentary Secretary, Board of Trade. The Bill, however, will be introduced as soon as possible.

Poisons Board on Drug Prescriptions

Of the 15 substances mentioned in the report of the Medical Panel of the Advertising Inquiry Committee, presented to the Minister of Health on 12 May, 1959, 10 are among those which the Board have recommended should not be supplied without a prescription, stated Mr. R. A. Butler, Secretary of State for the Home Department, in response to a question in the House last week.

Working Party on Legislation Concerning Medicines

Organisations from whom the interdepartmental working party on legislation concerning medicines will receive evidence will include the Agricultural Research Council Association of British Chemical Manufacturers, Association of British Pharmaceutical Industry, Association of Public Analysts, British Pharmacopoeia Commission, Government Chemist, Medical Research Council, Pharmaceutical Society, Poisons Board, and Royal Institute of Chemistry.

Monsanto to Produce Float-Zone Silicon Crystals

SILICONE of the highest quality commercially available anywhere in the world is to be made in the U.K. by Monsanto Chemicals Ltd. This development, the company announces, is the result of an agreement with the Siemans companies of West Germany, originators of the manufacturing process which Monsanto is to operate at its Ruabon, North Wales, factory. Production will start in the last quarter of 1960. Float-zone single crystals of high P-type resistivity or doped float-zone single crystals of P- or N-type resistivity will be produced. Monsanto will also supply polycrystalline rod for further processing, doping and crystal-forming by customers.

British Standard for Analysis of Coal-tar Food Dyes

AT the request of the Ministry of Agriculture, Fisheries and Food, British Standards Institution has undertaken the preparation of specifications for the colouring matters permitted for use in foods by the Colouring Matter in Food Regulations, 1957. These name 29 dyes manufactured from coal tar, together with caramel, cochineal colour, various colouring matters of vegetable origin, and certain pigments and lakes.

Appropriate methods of analysis which are generally applicable to the water-soluble coal-tar dyes in the permitted list have been collected in B.S. 3210, to which reference will be made in subsequent British Standards covering the individual colouring matters. Methods are given for determination of matter volatile at 135°C, matter insoluble in water, di-isopropyl ether extract, subsidiary dyes, chloride, sulphate, dye content, copper, arsenic and lead. A limit test for heavy metals (such as sulphides) is also included.

Copies may be obtained from the British Standards Institution, 2 Park Street, London W.1, price 7s 6d.

British Standard for Fire Equipment

A new publication issued by the British Standards Institution, 2 Park Street, London W.1, deals with requirements for chlorobromomethane extinguishers, and refers to relevant British Standards published subsequent to the first edition of B.S.1721. The new publication deals with the following carbon tetrachloride and chlorobromomethane fire extinguishers: hand pump type; gas container type; constant pressure type, and air pump type.

Rigidex Polyethylene Copolymers Range Extended

THREE new types of Rigidex high density polyethylene have been added to the range of materials marketed by British Resin Products Ltd. They are copolymers of ethylene with other olefins and are designed for use in applications where better resistance to stress-cracking and superior load bearing properties are required.

The new types are Type 3, which has the best mechanical properties and resistance to stress cracking; Type 12, which combines good processing qualities with good all-round physical properties, and Type 40, which is an easy flow grade designed for injection moulding difficult items. Type 3 and 12 can be moulded round metal inserts.

In general, the Rigidex copolymers are said to have a slightly lower softening point and tensile strength and they are a little more flexible than Rigidex homopolymers.

Applications for Type 3 include blown bottles, particularly where maximum stress-cracking resistance is required; blown film for boilable packs, etc.; cable insulation, monofilaments, where the best creep properties are wanted; and industrial mouldings calling for maximum impact strength and stress-cracking resistance.

Details of the copolymers are given in Technical Information Sheet No. 10, available on request from Information Department, British Resin Products Ltd., Devonshire House, Piccadilly, London W.1.

Chemical Industry Heads Output Rise

PRODUCTION of the chemical and allied industries during the third quarter of last year was 13% above the level of that quarter for 1958, and 12% above the 1957 period, according to the Treasury's *Bulletin for Industry* published at the end of last week.

This places the industry, together with the motor vehicles industry, in the lead among the major industries on the basis of increased production figures. The expansion in chemicals, says the report, looks like being even larger in the fourth quarter.

Overseas Fertiliser and Chemical Projects Consortium Formed

Chemical Works Projects have been formed by P.G. Engineering (of the Power-Gas Group), Humphreys and Glasgow, and Simon-Carves to supplement their normal activities by undertaking contracts for large fertiliser and chemical projects overseas. The joint company, thereby, will be able to call on "extensive resources".

The board will consist of Mr. J. P. V. Woolam, Mr. G. Gresle Farthing and Mr. R. W. Rutherford who will be the first chairman, each having an alternate director.

Registered office will be Simon House, 28-29 Dover Street, London W.1.

EQUIPMENT NEWS

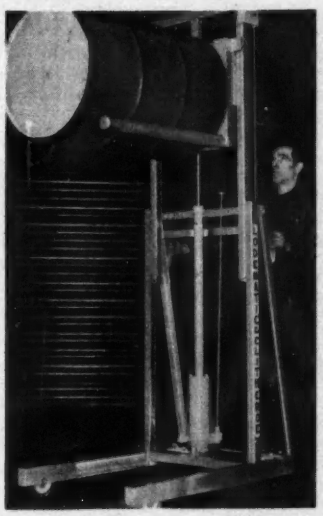
Chemical Plant : Laboratory Apparatus : Handling and Control Equipment

COILED GLASS CAPILLARY FOR H.T. G.L.C. A MORE efficient, speedy and economical method of gas chromatography is claimed by **A. D. Wood,** 4-5 Skinner Street, London E.C.1, who are the sole manufacturers of coiled capillary spirals in glass. These spirals have a bore of 0.008 to 0.010 in. and are available in lengths up to 500 ft.

A method of drawing coiled glass capillary has been developed at the B.P. Research Centre and the spirals are now being produced commercially by A. D. Wood. These spirals are said to be promising for high temperature use, i.e., 300° to 400°C In conjunction with argon and hydrogen flame detectors, results have been obtained very speedily and with greater efficiency—the number of theoretical plates is about 1,000 per foot.

The capillary is wound into a coil of 4 in. diameter and is supplied on a plated metal framework with rigid inlet and outlet ready for coating. Ends of the spirals project through hollow nipples so that they need only to be snapped off ready for use. Basic framework is 3½ in. high, while the overall height is 5½ in.; diameter is 4½ in. overall.

HYDRAULIC DRUM STACKER



New twin-speed hydraulic drum stacker by Lodematic Ltd., Clitheroe, Lancs, is only 28 in. wide, raises drums up to 500 lb. and halts at any height. Models with lift to 14 ft. are available

HYDROSTATIC TANK CONTENTS GAUGE A NEW pressure bulb type hydrostatic tank contents gauge, manufactured by **Firth Cleveland Instruments Ltd.,** Stornoway House, Cleveland Row, London S.W.1, will measure the head of liquid in most types of non-pressurised tank, wherever situated and regardless of size and height. Its indicator can be placed up to 250 ft. from the tank to show by a dial and pointer, 4 in., 6 in., 8 in. or 12 in. in diameter, either the depth of liquid or the tank contents. The gauge is self-operative and offers continuous indication.

It is supplied as two units, transmitter and indicator, together with suitable airline and connectors. The tank liquid fills the lower chamber of the transmitter unit to apply a pressure against the lower surface area of a synthetic rubber pressure bulb. This pressure, the hydrostatic head of liquid in the tank, is transmitted through a small bore copper or nylon air line to the indicator.

The gauge is suitable for all liquids compatible with the materials of the bulb and its housing. This is normally of high-grade cast iron, which may be stove-enamelled, hot-tinned, or left in natural finish depending on the liquid being gauged. The gauge can be equipped with additional accessories to provide automatic high or low level alarm indications or automatic control of a pump to maintain the liquid level in the tank between predetermined limits.

ELECTROLUBE LUBRICANT DISPENSER SUITABLE for "all switch contacts and bearing surfaces of turret tuners, plugs and sockets, volume controls, relays, gram motors, tape recorders, etc." is a lubricant in a special dispenser from **Electrolube Ltd.,** Slough Estates House, 16 Berkeley Street, London W.1.

Two types are supplied: No. 1 contains a volatile solvent which dissolves in films of oil or grease and is claimed to prevent sparking; No. 2 embodies a neat lubricant and is not miscible with any oil or grease. The ingenious dispenser has a 4 in. reach with a flexible 'snorkel' capable of entry into points of difficult access.

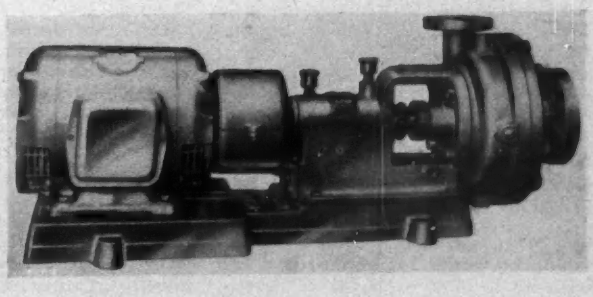
STAINLESS STEEL CENTRIFUGAL PUMPS A NEW range of stainless steel centrifugal pumps, designed specifically for the chemical and allied industries, has been developed by **Holden and Brooke Ltd.,** Sirius Works, Manchester 12. These units follow the basic pattern of other pumps in the well known J-Range which covers all applications in the centrifugal field from low pressure to high temperature-high pressure.

The JTV Series are supplied in four standard sizes up to a maximum capacity of 425 gall. minute and a head of 250 ft. Total working pressures, based on the combination of the developed head and the static pressure, range from 90 p.s.i. to 125 p.s.i. Additional sizes, giving duties beyond those quoted, are also available on a slightly extended delivery and certain of these sizes will, in the near future, be added to the range of stock sizes. The pumps may be fitted with a specially protected gland drip tray.

NIPOLEN MICROSCOPE

Zoom microscope, the Nipolen, from the Nichinan Sangyo Co. Ltd., Japan, with objective of 30 × —90 × and fixed square stage of 90 × 90 mm., weighs 2 kg. and measures 275 × 150 × 100 mm. Sole agents for the U.K. are Northgate Traders (City) Ltd., Moorgate House, 36 Copthall Avenue, London E.C.2

PORTABLE MAINS-OPERATED BETA GAUGE RECENTLY introduced into their range of nucleonic thickness gauges by **Baldwin Industrial Controls,** Dartford, Kent, is a small portable mains operated unit, designed to meet requirements of "those sections of industry where the expense



Holden and Brooke Ltd. stainless steel centrifugal pump

and refinements of the standard beta gauge are not justified."

The gauge is calibrated in arbitrary units proportional to weight per unit area, and the user can co-relate a factor for his own particular product.

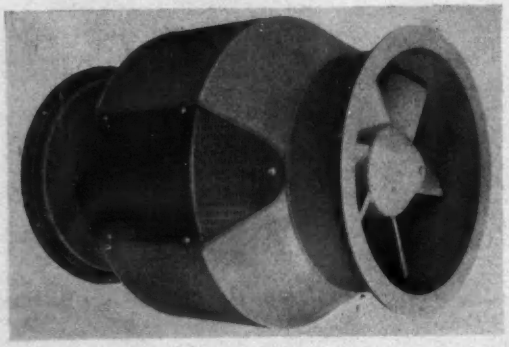
For simplicity, the gauge embodies only one radioactive source and detector. Output from the detector is compared with a calibrated reference potential and the difference in signal is amplified by an extremely stable low gain d.c. amplifier. The output signal is sufficiently powerful to operate both the built-in moving coil meter and, if required, an additional external milliamp recorder.

WIRE MESH INTERMEDIATE CONTAINER A COLLAPSIBLE intermediate-size bulk container for chemical powders, flakes, etc., has been introduced by the Dyestuffs Division of the Imperial Chemical Industries Ltd. The container is constructed of Weldmesh Ref. No. 35 (3 in. by 3 in. mesh 5 s.w.g.) and is capable of carrying half to three quarters of a ton of material in a large two-ply paper liner. It is "relatively cheap in cost, collapsible for return empty and can be handled conveniently by pallet or fork truck."

A new type of sliding closure in the base has been designed which allows the contents to be dropped easily in the quantities required.

The Weldmesh is supplied by the sole manufacturers, the **B.R.C. Engineering Co.**, Stafford.

BIFURCATED P.V.C. FANS RECENTLY added to the company's range of Turbo-Cyclone p.v.c. centrifugal fans is a range of bifurcated fans for removal of fumes. These employ true aerofoil-

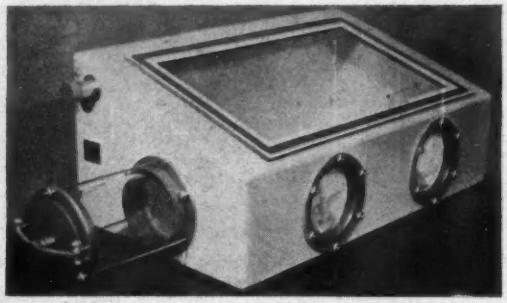


Turbo-Cyclone fan for fume removal has rigid p.v.c. blades

section blades of rigid p.v.c., and an improved fabrication technique is said to enhance performance. Manufacturers are **Turner and Brown Ltd.**, chemical plant engineers, Davenport Works, Bolton, Lancs, in collaboration with **Matthews and Yates Ltd.**, fan engineers, Swinton, Manchester.

PORTABLE HAND EMBOSSER A PORTABLE hand embosser called the Midgie supplied by the **British Automatic Co.**, 14 Appold Street, London E.C.2, is said to be suitable for labelling of dials and controls of all kinds, and for labelling chemicals and raw materials both in and out of doors. It is 10½ in. long, precision made and chrome-plated. The plastics labelling is self-feeding and the operator dials the required letters or numbers, which are embossed with permanently raised letters of 5/32 in. type size. Retail price is £12 10s.

Vacuum cabinet type VC by John Bass Ltd. equipped with disposable micro-filter



ROTARY DISCHARGE VALVE A ROTARY discharge valve "designed to provide continuous and free discharge of dust or fine powders from hoppers or bin outlets" has been produced in compact form by **Dunford and Elliott Process Engineering Ltd.**, Linford Street, London S.W.8.

The valve consists of a horizontal body with 8 in. square inlet and outlet flanges between which a 9 in. diameter four-bladed rotor revolves on a longitudinal axis. The rotor is fully shrouded and a positive seal is obtained between it and the housing by means of renewable hard felt seals recessed into the main body casting.

The unit is powered by a ½ b.h.p. totally enclosed fan-cooled, continuously rated squirrel cage motor which drives through a rugged triple reduction gearbox and provides a rotor speed of 12 r.p.m.

The rotary discharge valve is manufactured in cast iron or stainless steel and is available in two sizes: as a single type unit having a capacity of 100 cu. ft./hour, or as a duplex type unit with double this capacity.

LABORATORY HYGIENE APPARATUS AMONG the vacuum cabinets, centrifugal and axial-flow fans and 'man cleaner' units supplied by **John Bass Ltd.**, 36 The Broadway, Crawley, Sussex, is the cabinet type VC (illustrated) with hermetically-sealed airlock and quick action doors which permit passage into or out of main housing without change of internal conditions.

Supplied with vacuum pump to maintain "a satisfactory negative pressure against the possibility of any small leaks in the glove ports or air-lock", the type VC is fitted with a micro-filter for air exhaustion which is detachable for disposal purposes.

An efficiency rating of 99.9% is claimed for the type S/C de luxe cabinet handling dust particles down to five microns, while thermostat temperature control is available to 70°F ± 5°F.

The company also supplies a 'clean room', into which filtered air is drawn; a cabinet for de-dusting operators about to enter laboratories, etc., and a range of Bassaire fans for which ease of inspection and reduced vibration and sound level are claimed.

MINIATURISED GEIGER COUNTER A NEW five-ounce transistor geiger counter called the Gelman-Wallac Sparrow just placed on the market by the **Gelman Instrument Co.**, of Chelsea, Michigan, is stated to give instantaneous radiation warning to atomic workers and researchers.

"Not much larger than a king-size pack of cigarettes," the counter slips into a pocket, and when radiation reaches 1mR/hr, the speaker crackles violently. The tone of the speaker changes to a smooth buzz at 10 mR/hr and then to a high-pitched whine at 100 mR/hr. It operates on a set of small flashlight

Five-ounce Geiger counter

batteries which last for 2-3 weeks of normal usage. Size of the instrument is 4.96 by 1.89 by 0.94 in.

NEW METRICON PUMP

FEATURES incorporated in the Metricon type W pump, manufactured by **Metering Pumps Ltd.**, 21 The Mall, Ealing, London W.5, include various suction and delivery valves, available for use with the various pumping heads. For example, ebonite-lined heads have glass, ebonite or ceramic valves. Stainless steel pump heads incorporate a duplicate set of flat valves for high pressure duties. For handling suspensions, a valve gear of special design is used.

There are 12 standard models, of the reciprocating type, designed for adding solutions at a constant rate. All the pumps have a fixed stroke length of 2¼ in. Typical uses are for pumping clear corrosive liquid, alkaline suspensions, and boiler feed conditioning reagents.

Capacities of the type W, at a nominal fixed output of 72 s.p.m., vary from 40 to 520 gall./hour (simplex), and from 80 to 1,040 gall./hour (duplex). Maximum working pressures vary from 250 to 3,000 p.s.i. Reduction gears can be incorporated to give a slower stroking speed if required.

THERMOTANK COOLING TOWER

CLAIMED to be a major advance in the design of cooling towers is "a completely new type of tower, weighing less than half as much as conventional towers of similar capacity", manufactured by **Thermotank Ltd.**, Helen Street, Glasgow. The saving in weight, and in size, is achieved by the use of "a revolutionary fill material having a high wettability in which the water is cooled by a counter-current of air as it passes through very closely-spaced elements".

The structure is fabricated from rolled steel sections, treated against corrosion, and the casing is of galvanised sheets, with side panels which can be removed for maintenance. The tower contains a top-mounted fan which draws the surrounding air up through it from the bottom. The fill, which resembles a honeycomb structure, is arranged across the inside of the tower with the channels disposed vertically, and the cooling air passes up through these channels. A catchment tray at the base of the tower collects the cooled water for return to the appliance in which it is required.

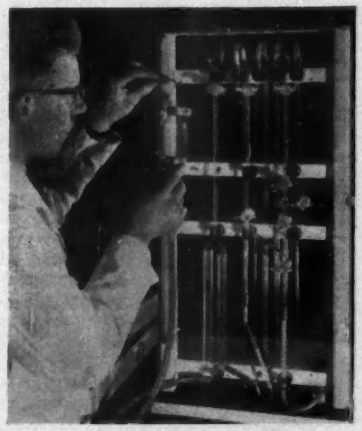
Initially the towers are being made in 12 graduated sizes, the largest, which can deal with up to 90,000 gall./hour; it has a diameter of only 20 ft., a height of 12 ft., and a total weight of 9½ tons. The fill, upon which the high capacity/size ratio of the tower depends, was invented by Carl Munters of Sweden.

PORTABLE GAS CHROMATOGRAPH

DERIVED from the 'Janak' method of analysis of gases in which CO_2 is used as the carrier gas and direct measurement made of the components eluted after absorption of CO_2 in a solution of caustic potash, the gas chromatograph by **Baird and Tatlock Ltd.**, Chadwell Heath, Essex, has been designed primarily for complete portability and convenience.

All superfluous parts have been omitted, including internal cooling coils and condensers which have been found unnecessary, as the heating effects at low gas flow rates are negligible. The apparatus is designed to operate at room temperature without thermostatting.

Gases which can be analysed are those which do not dissolve in aqueous caustic alkali and which do not condense under the working temperature conditions encountered. They are: N_2, O_2, CO, H_2, CH_4, C_2H_6, C_2H_4, C_3H_8, C_3H_6, i-C_4H_{10}, n-C_4H_{10}, and the unsaturateds, isobutene,



B.T.L. gas chromatograph 'Janak' in which CO_2 is used as the carrier gas. Apparatus is designed for complete portability

butene-1, *cis*-butene-2, *trans*-butene-2, 1:3 butadiene, and small concentrations of i-pentane (about 1%).

An accuracy of ±0.3% "is readily obtainable with a little practice, as is also the registration of minor components of the order of 1%".

Volume concentration of each component in a mixture, expressed as a percentage of the whole, may be shown graphically by plotting the burette reading against time and measuring the increase in volume at the known retention time of that component under the conditions used.

A variety of adsorbing materials may be used; eg., charcoal, silica gel and deactivated alumina. Among the partitioning liquids usable are: dimethyl formamide, n-hexadecane, carbitol and tetra-isobutylene.

Column diameters are 4 mm. with an effective length of 260 cm.

HERCULES GREASE PUMP

DESIGNED for feeding heavy lubricants, if necessary at high pressures, the Hercules Centralube heavy duty pump is capable of pumping bitumistic materials, e.g., Shell cardium C or D compound, or Mobil Dorcia 150, and can operate at a maximum working pressure of 15,000 p.s.i.

The pump is foot-operated, and has a handwheel which is turned down approximately every 20 to 40 applications to ensure that the lubricant finds its way into the pressure chamber. Output per stroke may vary slightly with the type of grease; in the case of a grease of penetration 250, it is 2.3 grams per stroke.

The high pressure that can be developed by the pump is suitable for lubrication of chassis and machine parts and through long pipelines. Weight is just under 50 lb., and it is equipped with two wheels for easy movement.

NEW FILTER MATERIAL

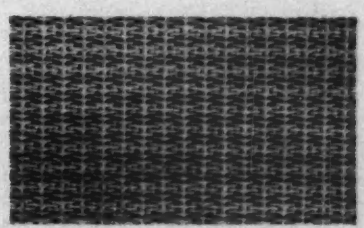
POROSINT Rigimesh, a new filter material produced by **Sintered Products Ltd.**, Hamilton Road, Sutton-in-Ashfield, Notts, has a corrosion resistance that is stated to make it suitable for breather vents in storage containers and vessels for highly corrosive and explosive fluids. A woven wire mesh made rigid by furnace welding the wires of the weave at all contact points, it is produced in stainless steel 18/8; it can also be made in Monel, Nimonic 75, 80 nickel/20 chrome, bronze and nickel, as well as in certain other metals. Manufactured in sheet form, Rigimesh can be fashioned into a wide variety of shapes.

Rigimesh filters with porosity ratings from 5 to 100 microns are in regular production; by modifying the processing cycle any specific micron rating can be produced for removal of all particles greater than 2 microns. The material can be fabricated in any required shape and punching, cold forming, rolling, drawing, arc welding and spot welding are said to offer no difficulty.

Usable in all types of existing filters, the material, it is said, is being used to filter fluids for which no other suitable filter has been found. It has a useful life of many years even when used for filtering hot caustic soda solutions. The claim is made that Rigimesh can replace centrifuges in the handling of excessively corrosive liquors and that because of its fracture-proof characteristics it can be used instead of ceramics and graphite in filtration units.

Aerating units employing the material give a low pressure drop for a large volume of gas delivered as fine bubbles. Other applications included are a catalytic bed; protection of instrumentation in high temperature gas streams; and thermal insulation at low temperatures.

Back-flushing will generally clean all



Rigimesh filter material

but the most adherent contaminants. Where filters can be cleaned chemically, either a 20% boiling caustic soda solution or a 15% solution of nitric acid can be used; the filter must then be thoroughly washed with warm water.

Solid Phosphoric Acid Catalyst For Alkylation of Benzene Gives High Yields

REPORTED to be a commercial success is an ethylbenzene process catalysed by a new solid phosphoric acid catalyst, designated UOP4, a mixture of phosphoric acid and kieselguhr developed by Universal Oil Products, U.S. The process has been in operation for more than six months at El Paso Natural Gas 28,000 gall./day unit at Odessa, Texas.

Typical product produced with El Paso's ethylbenzene process which has been designed and licensed by UOP contains 99% by weight ethylbenzene. Other aromatics, such as disubstituted materials, are stated to account for only 0.1%. Dehydrogenation of the ethylbenzene, followed by fractionation is stated to give styrene with purity of 99.75 to 99.9%.

Steam-cracking of propane provides the ethylene feedstock for the ethylbenzene. Propylene and ethylene are separated by absorption and stripping. The resulting C_2, and lighter gas stream is charged to the ethylbenzene unit's feed absorber. Benzene of high purity in this feed absorber takes up the ethylene feedstock and the liquid mixture then passes through feed heaters and into the catalyst chamber.

When alkylation is completed, unreacted light gases are separated from the reactor effluent. Unreacted benzene is removed in a benzene fractionator and recycled to the reactor. Ethylbenzene is separated from the benzene column bottoms in a second fractionator. Bottoms from this second fractionation consist mainly of diethylbenzene (about 68%) and butylbenzene (some 18%). The remainder is composed of cumene, triethylbenzene, and 2.6% ethylbenzene.

The catalyst charge at Odessa has not been changed since start up of the unit seven months ago. Ethylene conversion is stated to be 90% currently although it started at 98%. Reason advanced for this finding is that the unit's production has been raised beyond designed capacity with only a partial catalyst charge. El Paso are expected to increase the catalyst load shortly and to implement other minor changes which should raise the conversion rate to earlier levels.

Differences between the new catalyst and previous phosphoric acid-kieselguhr types are the proportions of each material used and the method of preparation. UOP claim that the new catalyst is less corrosive than other alkylating agents; can use a relatively low-content (29%) ethylene feed stream; and will provide ethylene conversions of 98.7%. Also noted are that activity is mainly toward primary alkylation under ethylbenzene-making conditions and that polymerisation reaction under these same conditions is slight.

Solid phosphoric acid catalyst was first tried for ethylbenzene in the early '40s by Koppers at their Kobuta, Pasadena, plant. Results were poor, with severe corrosion a major problem, so the project was abandoned (*Chem. Engng.*, 1959, **67**, No. 3, 55). The company now produces ethylbenzene using aluminium chloride as catalyst.

Use of the solid phosphoric acid kieselguhr catalyst by UOP is stated to overcome the problem of corrosion by an adaption of the company's widely used cumene process.

Superficially the El Paso process resembles that of Alkar, which is also an ethylbenzene production process. Alkar, however, utilises an 8-10% charge of propylene-ethylene refinery off gases while at El Paso the 30% ethylene-content ethane gas stream is obtained from cracking propane.

Use of Metering Pumps Increases Production and All-round Efficiency

CHIEF characteristic of a metering pump is its ability to measure and deliver a constant quantity of fluid within a critical limit of accuracy. Such pumps are essential to many chemical processes, particularly in ensuring a controlled proportionate feed of chemicals into a mixing operation.

At Thomas Hedley's research laboratories at Longbenton, metering pumps designed by Metering Pumps Ltd., are in use in a continuous soap process pilot plant which supplies small quantities of various qualities of soap for research and development. This plant, which is a rotary shear plate mixer, provides a quick method of producing soap in controlled quality to specific formulations. Into it are fed, by Metripumps at controlled rates, fatty acid and caustic. The mixed liquids are discharged from the mixer into a storage vessel, provision being made for re-circulation. The controlling factor of the mixing operation is the alkalinity of the product measured as a pH value.

In this operation the use of metering pumps assists production of various qualities of finished product from the same raw materials, and also permits the use of varying grades of raw materials since the rate capacity of the pump is infinitely variable and can be adjusted while running. The ability to alter the rate of pumping while in operation also enables a critical control to be exercised over the pH values of the finished product. In general, simplification of operation is obtained, and the constant attention of operators and installation of complicated instruments is avoided.

Metering Pumps Ltd. report that use of the Metripump G type has resulted in improved and more compact layout, increased production and a simplified mode of operation at a chemical manufacturer's plant in the Stockport area. Plant supervision has been reduced and the possibility of human error in the control of the additives required practically eliminated.

The plant installed was required to carry out a reaction involving the simultaneous addition of two major raw materials in a fixed ratio over a period of five hours. The two materials could not be mixed before they entered the reaction vessel.

On an experimental production unit the materials required in the reaction were broken down into separate parts. Small measuring tanks, fitted between the storage tanks and the reaction vessel, were filled automatically by the use of float switches and magnetic valves. Total contents of the measuring vessels were then added to the reaction vessel via needle control valves. This system, although in use for some two years, was complex and the needle and magnetic valves and the float switches required considerable attention.

In designing the new plant, measuring tanks, magnetic valves and the float switches have been replaced by one Duplex metering pump which provides a continuous feed of the two raw materials in a constant fixed ratio although the overall rate of addition is infinitely variable.

The system just described has been in operation for three months and the metering pump in question has handled 40,000 gallons of the raw materials without faltering.

New Towers at BP's Kent Refinery

Two new towers, one 100 feet high weighing 35 tons, and the other 80 feet high weighing 25 tons, were recently erected at BP's Kent Refinery on the Isle of Grain. These towers are part of the latest processing plant to be built at Kent, which will have the capacity to manufacture 30,000 tons a year of special boiling point solvents. These solvents are used in the manufacture of paint and lacquers, and in the essential oils, fatty oils and rubber industries.

The towers were brought from Greenwich where they were fabricated, and each one took about an hour to lift into vertical position. Good progress is also being made on other sections of this project.

Naphthalene and Octyl Alcohol Isomers Exempt from Duty

Under the Import Duties (Temporary Exemptions) (No. 3) Order, 1960, certain dyestuff intermediates, naphthalene and certain mixed isomers of octyl alcohol will be temporarily exempted from import duty chargeable under the Import Duties Act, 1958. The Order came into operation on 2 March 1960, and has been published as Statutory Instruments 1960, No. 294.

Overseas News

GREEK SCIENTIST'S LOW TEMPERATURE PROCESS GIVES HIGH-NICKEL CONTENT ALLOY

TWO processes which allow conversion of nickel-bearing iron ore mined in Larymna, central Greece, into alloys of high nickel content and steel are reported by Professor Moussoulos, of the Athens Polytechnic and head of the research department of the Greek chemical fertiliser company which owns the Larymna plant.

Krupps of Germany have been conducting experiments on the spot since December last, and have established the soundness and value of the processes. Their findings have been accepted by the Greek Ministry of Industry and it is understood that Krupps will be closely associated with the new Larymna venture.

The new process is a low temperature one which allows production of alloy of which one-half is pure nickel. Even more significant is that the discarded iron ore can be used in its melted state for the production of steel at low cost, without the need of a blast furnace.

Nearly £3.5 million has so far been invested in the Larymna works by the Greek company since 1952. Krupps have supplied machinery and installations and, to meet the new requirements, the Larymna installations will be readjusted and added to over the next 18 months at a cost of nearly £1,750,000. The new facilities are expected to produce annually 4,500 tons of purified nickel and 90,000 tons of steel at internationally competitive prices.

It is reported also that technical advice from Krupps has made it possible to produce ferrous alloy of low nickel content (about 6%). The sharp decline in the international price of nickel last year caused the Larymna plant to suspend work.

The Larymna mine is one of only two European mines yielding this mineral. The Greek economy is expected to gain about £5 million a year in foreign exchange as soon as the processes are put into operation.

Du Pont Nylon in the Argentine

With the recent operation of a plant for the production of nylon raw material and cellophane foil in the Argentine, it is now estimated that the installations of the E. I. du Pont de Nemours chemical concern in that country are worth a total of $60 million.

Indonesia Urea Plant

The Washington Export-Import Bank has just granted a loan of $33.2 million to the Republic of Indonesia to help in financing construction of an urea plant costing $43.2 million. The plant will be located at Palembung in Sumatra and will belong to a Government-owned company, Sriwidjaja Fertilizers, Inc. It will use natural gas supplied by the Standard Vacuum Petroleum Co. of Indonesia from local oil fields. Manufacture will be based on the Pechiney-Grace process. A contract for design and construction of the plant has been awarded to the Foster Wheeler Corporation, New York.

Czech Chemicals Output

During 1959 some 146,000 tonnes of nitrogenous fertiliser, 151,000 tonnes of phosphoric acid fertiliser, 583,000 tonnes of sulphuric acid and 43,700 tonnes of synthetic staple fibres were produced in Czechoslovakia. It is stated that production of chemical plant and equipment in 1960 will be higher by 32%.

Pharmaceuticals and Fertilisers in El Salvador

From Central America comes news of a recent visit by a representative of the Vick chemical company to El Salvador for the purpose of making arrangements for installation of a pharmaceutical factory.

A report in preparation by Insafop and a Central American agency on the subject of fertiliser production in El Salvador includes details of possible U.S. financial participation in such a project. The document will also describe methods of Central American financial participation.

South African Carbide

An offer has been made by Holland Electro-Chemical for the purchase of the carbide manufacturing assets of South African Carbide and By-Products Co. which has been accepted by the directors, subject to confirmation by members.

Holland Electro will pay £100,000 for approximately 70 acres of land, on which the buildings, machinery and plant of the carbide factory are situated, and a further sum, approximating to £75,000 for the stocks of carbide and stores on hand at 1 March 1960, on which date the total purchase consideration is payable.

South Africa Steps Up Petrol Production

A third reactor is to be erected for Sasol, South Africa's big oil-from-coal project, by South African firms with local materials, as part of the scheme chiefly aimed at stepping up the Union's production of petrol. Sasol are also reported to be turning attention to polythene production, of which the Union at present imports some £3 million worth annually.

The first two reactors were constructed by Kellogg International Corporation Ltd., and when the third plant is completed it will bring Sasol's petrol output to 39 million gallons a year. It will be constructed by Veveor, of Vanderbijlpark; Babcock and Wilcox; and Iscot.

Man-made Fibres Record Production in U.S.

Production capacity for man-made fibres in the U.S. at 2,350 million lb. at November 1959, set a new record, a survey by U.S. Textile Economics Bureau indicates. By July 1960 capacity is expected to increase to 2,470 million lb. Both totals include acetate yarn, rayon, non-cellulosic (synthetic fibres and textile glass fibres).

Glass fibres, according to the survey, may make the top capacity gain in the industry. At present the capacity is 160 million lb., but during the next two years will probably be doubled.

Spain to Increase Glass Fibre Production

Two new plants for production of glass fibre sheeting and for treatment of silicones are to be installed by the Spanish company Resinas Poliésteres (Reposa).

Glass fibre, hitherto produced in very small quantities in the country, will then be made at the annual rate of some 200,000 cubic metres, later increasing to 500,000. The process of the U.S. company Filon will be used by Reposa.

High-Temperature Blowing Agent

Expandex 177, a new blowing agent for the plastics and rubber industries, has been developed by National Polychemicals, Inc., Wilmington, Mass.

It is reported that Expandex 177 decomposes in the temperature range of 240°-250°C, some 50°C higher than any nitrogen-releasing agent at present available. This high decomposition temperature permits processing of compounds containing Expandex 177 at temperatures up to 220°C without the danger of premature blow.

Research quantities are available for distribution and the firm expects to produce on a modest semi-works scale in the near future.

More Potassium Exploitation in Canada

With potassium now being mined in the Canadian province of Saskatchewan by the Potash Co. of America, it is announced that a second concern, International Minerals and Chemicals, are to start potassium exploitation in Canada in the coming year. Between them, these two undertakings have invested some $50 million (Canadian) in Saskatchewan, which is the centre of the country's potash deposits.

German Production of Chemical Fibres

According to a recent statement by the chairman of the West German chemical fibre association Industrievereinigung Chemiefaser, Federal German production of chemical thread products from cellulose base (rayon, acetate, etc.) in 1959

was some 10% above the output for the previous year, and production of chemical spinning fibres on the same base (acetate fibre, cellulose fibre, etc.) was up by just under 10%. West Germany's production of synthetic fibres and thread in the first ten months of 1959 alone was 6,500 tonnes higher than the annual total —24,500 tonnes—for 1958.

Dow Chemical/Catalin Sign Development Agreement

Signing of an agreement is announced by Dow Chemical and Catalin Corporation which has as its aim joint testing and commercial development of new compounds. Dow are to test chemical compounds developed by Catalin and then give that company full reports of their results. Catalin report that they expect the new project to speed up both the creation of new chemicals and the development of markets for them.

I.C.I.A.N.Z. Buy Ammonia Plant in Australia

The synthetic ammonia plant built during the war at Ballarat, Victoria, has been sold by the Federal Government to I.C.I. of Australia and New Zealand Ltd. The plant produces industrial ammonia and ammonium nitrate.

Draft Law for Utilisation of Italian Sulphur

The Italian Ministry of Industry has submitted to Parliament a draft law to promote utilisation of Italian sulphur in production of synthetic textile fibres or fabrics intended for export. This law would enable the Treasury to pay the industry the difference between the cheaper foreign sulphur and dearer local product, provided it uses the latter in processing.

The aggregate amount that could be distributed under this heading during one financial year is not to exceed Lire 450 million (some £253,400).

Increases in Dutch Polythene Output

The various chemical enterprises of the Netherlands State Mines in the Province of Limburg, and particularly the sector producing raw materials for plastics, are expanding rapidly. Production of polythene which began less than a year ago, has risen so greatly that the present coke ovens will soon be inadequate for supply of ethylene in sufficient quantity. In the effort to treble production, a new cracking plant is being built at Zeist, near Utrecht, which will supply know-how to plastics manufacturers.

More Carbon Black Expansions in U.S.

Latest U.S. company to announce plans for carbon black expansion is J. M. Huber Corporation. This company is to increase capacity at its Baytown, Texas, plant from 60 million lb. to 100 million lb. a year. With 12 reactors in operation, Huber are to add 13 smaller ones. Construction is scheduled to start by the end of the year.

High abrasion furnace black is produced by Huber from heavy residual oil obtained at Houston area refineries. The company also has a carbon black plant at Borger, Texas, with an annual output of 85 to 100 million lb., depending on the type of black it is producing.

Canadian Chemicals Production A Record in 1959

Production of all chemicals in Canada, data for which are contained in the Bureau of Statistics' monthly report "specified chemicals" was greater in 1959 than in 1958. Totals were: acetylene 181,831,000 cu. ft. (against 178,237,000 in 1958); hydrochloric acid 42,567,405 lb. (35,816,733); sulphuric acid 1,609,574 tons (1,495,428); anhydrous ammonia 391,312 tons (346,156); ammonium sulphate 326,306 tons (323,328); chlorine 286,885 tons (267,907); mixed fertilisers, 793,601 tons (711,771); formaldehyde 56,112,290 lb. (45,271,299); oxygen 1,351,672,000 cu. ft. (1,164,550,000); and sodium hydroxide 339,530 tons (309,944).

Standard Oronite's Petrochemical Venture with Progil

New Franco-American venture in the petrochemical industry announced last week was that of Standard of California, through a subsidiary, Oronite Chemical Corporation, who are to collaborate with one of the leading French chemical companies, Progil, and with the Pechelbronn-Antar oil group, in the development of an aromatic derivative plant beside the Antar refinery at Donges, near St. Nazaire.

The new plant will produce 8,500 tons of *p*-xylene per annum for sale to the French Rhodiaceta textile group. *p*-Xylene is used in the making of Tergal fibre, the French version of Terylene. For this purpose Oronite have set up a French branch to be called Californie Atlantique, which will hold a half share in the Donges factory. The other half will be held by the Société Petrochimique de l'Atlantique, a new company specially created for the purpose, in which Focantar will hold 35% of the 5 million new francs capital, Pechelbronn 20%, Progil 25%, the Worms Bank 5%, and two other French companies, Serco and Sofibanque, 10% and 5% respectively. The plant is expected to come into operation by the end of this year.

Detergent-Intermediate Manufacture by Standard-Kuhlmann

Franco-American group, Standard-Kuhlmann (a combination of Esso Standard and Kuhlmann, the French rubber and chemical firm) have announced their intention to concentrate production of aryl alkyl for detergent at Port Jerome, Esso's refinery, near the mouth of the Seine. Up to now, Standard Kuhlmann have produced aryl alkyl and Paraflow, an additive for lubricating oils, at their plant at l'Estaque.

Hydrofluoric Acid Price Falls

For tank car quantities the price of hydrofluoric acid in the U.S. has fallen by $2.10 per 100 lb. to $13.40. Blockson Corporation, an Olin Mathieson subsidiary, initiated the price cut, but was quickly followed by Pennsalt, Stauffer Chemical, Allied Chemicals' General Chemical Division, and others.

Du Pont's Dutch Facilities for Bulk Storage of DMF and DMA

TO service their European customers better, Du Pont de Nemours International, S.A., have set up facilities in Rotterdam, Holland, for bulk storage and delivery of dimethylformamide (DMF) and 40% aqueous dimethylamine (DMA).

With the new facilities the company say they will be able to provide delivery in bulk as well as in drums to meet the specific needs of their various customers with prompt and better service. The facilities include modern tank cars and a special fleet of stainless steel tank trucks for bulk shipment. In addition, an ample supply of 55-gall. drums is available for shipment by any convenient transportation means. Pakhuismeesteren, N.V., of Rotterdam, will handle the warehousing and shipping of these chemicals.

DMF and DMA are produced by E. I. du Pont de Nemours and Co. at their Houston, Texas, U.S., works, from where they are shipped by special tank vessels to the Rotterdam storage facilities.

Du Pont dimethylformamide (DMF) is a colourless, low viscosity liquid with outstanding solvent power for a wide variety of organic and inorganic materials. Major use to date for DMF has been as a resin and polymer solvent. For example, DMF is widely used as the spinning solvent for fibres made of polyacrylonitrile and its co-polymers. DMF found a unique use in the field of synthetic organic chemistry as a reaction medium. Its catalytic properties for many reactions gives higher yields in shorter periods of time. A third usage of DMF arises from its high acetylene solubility and selectivity. For this reason, it is used commercially for the recovery of acetylene manufactured by the pyrolysis of hydrocarbons.

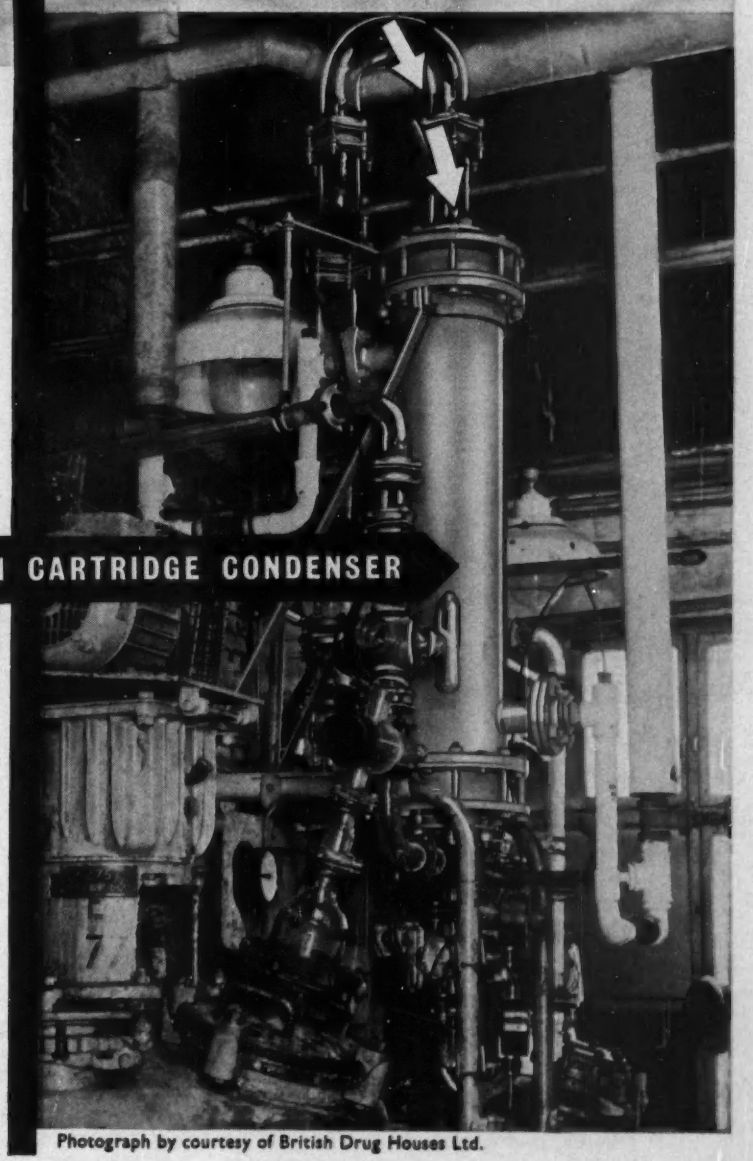
Dimethylamine offered now in Europe by Du Pont is as a 40% aqueous solution. It is used in the manufacture of sodium dimethyldithiocarbamate, an intermediate for the other salts of dimethyldithiocarbamic acid and for the production of a series of tetramethylthiuram sulphides. The dimethyldithiocarbamate salts and tetramethylthiuram sulphides are widely used as accelerators for the vulcanisation of synthetic rubbers. DMA is also important in the production of agricultural herbicide salts of the 2,4 D type; it is used in the tanning of leather as an accelerator for unhairing of skins and hides with limes; and as an intermediate in the preparation of tertiary amines which in turn are used in the preparation of quatenary ammonium salts.

CONDENSATION

OF CORROSIVE VAPOURS

The Powell Duffryn Cartridge Condenser has proved its efficiency in the economical handling of corrosive liquids and vapours in many chemical and pharmaceutical applications. The unit relies on impregnated graphite for its corrosion resistance on the process side.

The steel shell is completely coated for protection against weak acid solutions when washing through, and outside, against atmosphere which eliminates painting and enables a permanently clean appearance to be maintained.



Photograph by courtesy of British Drug Houses Ltd.

THE POWELL DUFFRYN CARTRIDGE CONDENSER

PRINCIPAL FEATURES:

- RESISTANT TO MOST ACIDS, ALKALIS AND SOLVENTS
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PEOPLE in the news

● Chairman of the newly-formed Drayton-Southern Ltd. will be **Col. P. H. Lloyd, T.D., D.L.,** and the managing director will be **Mr. J. G. Lubbock.** Remaining members of the board will be drawn from the respective boards of Southern Instruments Ltd. and the Drayton Regulator and Instrument Co. Ltd. (See p. 414.)

● **Mr. T. J. Thomas** has been appointed technical manager of Dunlop's Composition Division. He took up this appointment on 1 March. Previously Mr. Thomas was manager of the polymer development section of Dunlop's Research Centre.

● **Mr. Douglas Latham** has been appointed a director of Edwards High Vacuum Co. Ltd.

● **Mr. J. M. Kershaw,** director of development and market research, is appointed alternate to **Mr. T. P. Berington**

J. M. Kershaw

C. J. Smith

on the board of Monsanto Chemicals Ltd. Mr. Kershaw, who joined Monsanto in 1946, has been responsible for a number of special development projects, including construction of the company's new factory at Fawley. As director of development and market research he was chief engineer of the company.

● **Mr. C. J. Smith, M.Sc., A.R.I.C.,** has resigned his appointment with Dorr-Oliver Co. Ltd., and has joined Eimco (Great Britain) Ltd. as deputy manager, Filter Division. He is honorary recorder of the Chemical Engineering Group of The Society of Chemical Industry.

● **Mr. J. Telfa,** I.C.I. Wilton Works assistant accountant, has been appointed secretary and accountant of the Severnside Works. **Mr. F. B. Hayes,** who moved from Wilton last June, is appointed senior construction engineer at Severnside. Both will be joining there a small team headed by Dr. H. S. Hirst, general manager, and one of the pioneers of the Wilton Works.

● **Mr. A. L. Dorling** has been appointed to the board of Fisons (Pty.) of South Africa, an associated company of Fisons. Mr. Dorling's responsibilities as commercial director will include the investigation and development of new projects.

● **Mr. Barrie Heath, D.F.C., M.A.,** managing director of Powell Duffryn Carbon Products Ltd. and a director of other companies in the Powell Duffryn Group, relinquished his Powell Duffryn appointments on 29 February, to join the board of Triplex Safety Glass Co.

R. Turner

● **Mr. R. Turner, M.I.Mech.E.,** acting managing director of Powell Duffryn Technical Services Ltd., has joined the board of P.D. Carbon Products Ltd. as deputy chairman, and that **Mr. F. W. Stokes,** a director and present works manager of the company's Hayes factory, has been appointed general manager.

TANTIRON

pipes, vessels & fittings for handling Corrosives

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Tantiron, the registered trade name applied to Silicon Iron Castings, was first cast and produced on a commercial scale by The Lennox Foundry Co. before 1910, so we are well justified in our claim that it is the first—and still the best—corrosion resisting, high silicon iron.

Tantiron is manufactured into Pumps, Valves, Dephlegmators, Pipes, Cocks, Absorption Towers, Pans, Reaction Vessels, Coolers, etc.

Tantiron resists most of the known persistant corrosive agents.

Tantiron Effluent Pipework is essential in chemical works and laboratories or where drainage systems must last a lifetime or more.

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Commercial News

- **E.M.I. Bid Approach for Henry Simon**
- **Joint Co. for Southern Instruments/Drayton**
- **Unilever Combined Profits Rise by £13 m.**
- **Simon-Carves/Henry Simon Integration?**

British Petroleum Co. Ltd.

Agreement has been reached between British Petroleum Co. Ltd. and the Bridgestone Tire Co. of Tokyo for supply by B.P. of considerable quantities of liquefied petroleum gas, to be delivered from Kuwait. The agreement does not specify actual quantities.

Drayton-Southern Ltd.

In the course of joint formation by Southern Instruments Ltd. of Camberley, and the Drayton Regulator and Instrument Co. Ltd. for the purpose of expanding the instrumentation and control interests of both companies is Drayton-Southern Ltd. Research production and sales resources will be available to the new company from the parent companies. These resources include the Drayton Regulator and Instrument Co.'s nation-wide technical sales network and extensive machine shops. and Southern Instrument's large research staff and design and production facilities backing their established business in electronic equipment, in the data handling, precision measuring, analytical and communication fields.

Drayton-Southern whose authorised capital will be £100,000 will have the benefit of attractive licensing agreements with U.S. companies and will initially offer integrated monitoring and warning systems for the industrial measurements and control of temperature, pressure, strain, vibration, acceleration, load and displacements, based on well-tried and widely used principles. Instrumentation derived from specialised knowledge in such fields as textiles, chemical manufacture, paper making, will also be offered.

Hickson and Welch

Group net profit for the year to 30 September 1959, for Hickson and Welch (Holdings) totalled £329,966 compared with £260,624 for the previous year. A dividend of 16% is being paid, equivalent to 14.8%, including a special interim.

Current assets are £1,385,663 (£1,293,802) and liabilities £838,063 (£674,224). Commitments total £100,000 (£58,000).

Mr. Bernard Hickson, chairman, reports that he looks forward to the results of the current year showing an increase.

Power Gas Corporation

While plans for the merger of the Power Gas Corporation with Davy United continue under discussion, the former group's trading report for the year to end of September has been produced, showing trading profits to be up from £1,380,186 to £1,857,713 (net £784,927 (£534,601)). An increase of 10% in the effective dividend is shown; and a final of 22½% makes 30% on the £1.4m. (20%).

Since the year end orders have returned to a satisfactory level, it is stated; orders booked totalled £7.75m. (£9.25m.).

Simon-Carves/Henry Simon

Simon-Carves and Henry Simon (Holdings) have announced that discussions are taking place regarding possible means of closer integration of the two companies and their subsidiaries which are now known as the Simon Engineering Group. A further announcement is to be made in due course.

Henry Simon has a 12½% holding in Simon-Carves with which company there are also board links. Issued capital of Henry Simon is £2,001,675 comprising £716,550 in £1 6% preference and £1,285,125 in 5s ordinary. At year end 1958 net assets totalled £5,213,980.

Simon-Carves has in issue £1.5 million all in 5s ordinary shares. The end 1958 balance sheet showed total assets of £15,116,739.

Electrical and Musical Instruments Ltd. have intimated to the board of Henry Simon (Holdings) that they are prepared to make a bid for all the issued share capital of the company. This intimation, Henry Simon state, was received subsequent to their statement that talks were taking place between the company and Simon-Carves Ltd. regarding the possible future integration of the two businesses (see above).

The position is being earnestly considered by the Henry Simon board. In the meantime shareholders are advised to hold on to their shares. Similarly, Simon-Carves advises their shareholders not to sell pending a further announcement on the negotiations with Henry Simon.

Ilford Ltd.

Chairman's report of Ilford Ltd., photographic material makers associated with I.C.I., shows that no decision has yet been reached about manufacturing film and paper on the Continent. Meanwhile the board are confident that working with I.C.I. the company will continue to expand and enlarge their share of rapidly increasing world trade in photographic products.

A reorganisation is being made of sales and distribution departments in preparation for expected increases in demand for the company's products. New depots have been opened in West London and in Newcastle, and a further one is being built in Bristol.

Unilever Ltd.

Combined value of the 1959 turnover of Unilever Ltd. and Unilever N.V. rose by £59 million to £1,787 million. Of this £58 million accrues to the second six months of that year.

Combined profits rose from £92.6 million to £114.2 million, and net profit from £47.3 million to £60.1 million.

Market Reports

ACTIVE TRADING IN MOST SECTIONS

LONDON Active trading conditions have been reported from most sections fo the industrial chemicals market and the movement in the aggregate has been substantial.

Contract demand for soda products and potash chemicals has continued steady, while borax, boric acid and hydrogen peroxide are items for which there is a persistent call.

Copper sulphate is moderately active at the lower price of £80 per ton less 2% f.o.b. Liverpool. Prices elsewhere show little change and the undertone is firm. Business in fertilisers is reported to be better. Prices in the coal tar products market are well held and most items are moving steadily. Naphthalene supplies are none too plentiful and the import duty has been lifted as from 2 March.

MANCHESTER Satisfactory trading conditions have been experienced during the past week in most sections of the Manchester market for chemical and allied products. There is a steady call for contract deliveries of the alkalis and the ammonia and magnesium compounds, as well as in a wide range of miscellaneous chemicals, including borax and boric acid, hydrogen peroxide, and bleaching materials. Fresh inquiries have been on a fair scale. Except among the non-ferrous metal products there has been little movement of prices. Sulphate of copper is cheaper on balance at £80 per ton, f.o.b. Liverpool. The movement of fertiliser materials continues on a seasonally improved scale.

GLASGOW Little alteration has taken place during the past week in the Scottish heavy chemical market. From a fair cross section of industry demands have been maintained at a good level, buying generally has been brisk. Both spot and contract requirements have featured well as have those pertaining to forward deliveries.

Apart from the usual range of basic chemicals, demands have been varied. Price levels have been maintained and little change has taken place apart from those related to metal derivatives. Some interest has been shown in regard to imports during the week while the export market shows little alteration.

DIARY DATES

MONDAY 7 MARCH

C.S.—Cambridge: University Chemical Laboratory, Lensfield Rd., 5 p.m. 'Steric effects of hyaluronic acid on the distribution of other solutes', by Dr. A. G. Ogston.

C.S.—Cardiff: Chemistry Dept., University College, Cathays Park, 5.30 p.m. 'Developments in the chemistry of bacterial walls', by Prof. J. Baddiley.

C.S.—Durham: Science Laboratories, South Rd., 5 p.m. 'Organic chemistry of metal carbonyls', by Dr. M. C. Whiting.

Inst. Physics.—Glasgow: University, 7.15 p.m. 'Biological hazards of radiation', by Prof. J. Rotblat.

Plastics Inst.—Leicester: Grand Hotel, 6.45 p.m. 'Recent developments in vacuum forming techniques', by A. M. Craig.

S.C.I.—London: 14 Belgrave Sq., S.W.1., 6.30 p.m. 'Recent advance in the chemistry and industrial applications of hydro—and organo-boron compounds', by Dr. W. Gerrard.

S.C.I.—Sheffield: Grand Hotel, 7 p.m. 'Corrosion problems of high-temperature pressurized water reactors', by J. N. Wanklyn.

TUESDAY 8 MARCH

A.I.C.—Hatfield: Technical College, Roe Green, 7 p.m. 'Science in the detection of crime', by Dr. I. G. Holden.

S.C.I.—London: 14 Belgrave Sq., S.W.1., 6 p.m. 'Application of the engineering sciences in the chemical industry', by H. Fossett.

Soc. Instrument Tech.—Manchester: Manchester Room, Central Library, St. Peter's Sq., 6.45 p.m. 'Some instrumental developments in the oil industry', by G. C. Eltenton.

WEDNESDAY 9 MARCH

I.Chem.E.—Leeds: Lecture Theatre A, Houldsworth School of Applied Science, University, 7 p.m. 'Recent developments in heat transfer', by O. A. Saunders.

Inst. Fuel.—Manchester: Engineers' Club, Albert Sq., 2.30 p.m. 'Problems with use of high sulphur oil fuels at Marchwood Power Station and experience with chemical additives', by D. Clarke.

Inst. Metal Finishing.—London: 80 Fetter Lane, E.C.4., 6.30 p.m. 'Inspection and testing of organic finishes', by R. J. Brown.

Manchester Metallurgical Soc.—Manchester: Manchester Room, Central Library, 6.30 p.m. 'Metallurgical aspects of fuel elements for nuclear reactors', by Dr. H. M. Finniston.

Plastics Inst.—Cardiff: Angel Hotel, 6.30 p.m. 'Processing and properties of polypropylene', by J. G. Nichols and C. D. Wells.

Plastics Inst.—Leeds: St. Mark's Hse., 186 Woodside Lane, 7.15 p.m. 'P.v.c. coated metals', by W. E. Martin.

R.I.C.—London: Chelsea College of Science and Technology, Manresa Rd., S.W.3. 'Surface chemistry', by Dr. K. G. A. Pankhurst.

R.I.C.—Rochdale: Technical College, Nelson St., 7.15 p.m. 'Rarer metals'.

S.A.C.—Birmingham: University, 6.30 p.m. 'Plant growth-promoting substances—some analytical aspects', by Prof. R. L. Wain.

S.C.I. with Assn. of Public Analysts.—London: 14 Belgrave Sq., S.W.1., 6.15 p.m. 'Results of collaborative assays'.

THURSDAY 10 MARCH

C.S.—London: Large Chemistry Lecture Theatre, Imperial College of Science and Technology, Prince Consort Rd., S.W.7., 7.30 p.m. Liversidge lecture: 'Ionic crystals and their melts', by Prof. A. R. J. P. Ubbelohde.

C.S.—Manchester: Large Lecture Theatre, Chemistry Dept., University, 4 p.m. 'Structure of yeast', by Prof. A. A. Eddy.

R.S.—London: Burlington Hse., Piccadilly, W.1., 4.30 p.m. Ordinary meeting.

S.C.I.—Wirral: Central College of Further Education, Carlett Park, Eastham, 7.30 p.m. 'Some observations on analytical chemistry', by Dr. J. Haslam.

FRIDAY 11 MARCH

C.S.—Dublin: University Chemical Laboratory, Trinity College, 7.45 p.m. Lecture by Prof. R. C. Cookson.

C.S. with R.I.C.—Sheffield: Chemistry Dept., University, 5 p.m. 'Some problems in phosphonitrilic chemistry', by Dr. N. Paddock.

O.C.C.A.—Liverpool: Constitutional Club, Tithebarn St., 6.30 p.m. 'Some phyico-chemical aspects of alkyd practice', by A. R. H. Tawn.

S.A.C. with R.I.C.—Swansea: 'Advantages and disadvantages of visual colorimetry', by G. J. Chamberlin.

Soc. for Water Treatment and Examination—London: Royal Society of Health, 9.30 p.m. Annual general meeting, followed by Symposium on 'Pollution of surface water supplies'.

SATURDAY 12 MARCH

S.A.C.—Manchester: 2.15 p.m. 'Analysis of non-soapy detergent products', by G. F. Longman.

TRADE NOTES

Q and Q Exhibitions

Exhibitions of interchangeable laboratory apparatus by Quickfit and Quartz Ltd. will be staged at Nottingham Technical College from 7 to 11 March; and at the annual Exhibition of Scientific Apparatus to be held by the British Association of Chemists (Liverpool Section) at Liverpool University on 6 and 7 April.

Titanium for Jigs

A seven-page folder describing the use of titanium in jigs for the chemical industry is available from the I.C.I.'s London office, P.O. Box 19, Templar House, 81-87 High Holborn; or from sales offices throughout the U.K. and Eire.

Pipework Engineering Division Formed

Setting up of a pipeworking engineering division to be responsible for the making and marketing of all forms of manipulated pipework is announced by Stewarts and Lloyds Ltd. The new division will have headquarters at Broad Street Chambers, Birmingham 1; and at 41 Oswald Street, Glasgow C.1.

New Packaging Materials

Materials used in manufacture of 15 prize-winning packages in a recent U.S. competition are now being sold in this country by Dow Chemical (U.K.) Ltd., 48 Charles Street, London W.1. These include Trycite, a highly transparent polystyrene film; Durafilm, a moisture-proof combination of cellophane, polythene Saran, etc.; and a further material described as a combination of acetate, foil and vinyl-coated pouch paper for drag, cosmetic and dry foods requiring high moisture protection.

Mould Release Agents

The Nalco RA series of mould release agents suitable for polyurethane foam applications and manufactured by Nalco Chemical Co., Chicago, are now available from Jacobson ven den Berg and Co. Ltd., 3-5 Crutched Friars, London E.C.3, appointed U.K. agents.

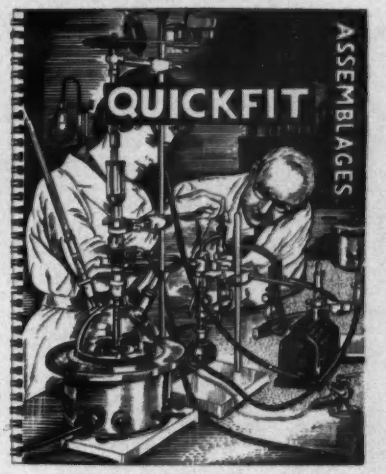
Phenol Hearing

(*Continued from p. 402*)

phenol may not matter, for its place can be taken by synthetic phenol, but the loss on the other products of distillation does matter, and the loss of the naphthalene is an important consideration."

With regard to products from refined crude tar acids—other than phenol—Mr. MacKenna said there were no adequate substitutes and it would mean the loss of essential raw materials. It was not right to state that price competition always secured the greatest benefits for the public. The effects of such competition at the present time might produce short-term benefits but these would be outweighed by permanent detriments.

This was the last day of the 12-day hearing. Judgment by the Restrictive Practices Court has been reserved.



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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On Sale 30 March

Novel 4, 4-disubstituted-pyrrolidone-(2)s and a process for manufacture. Roche Products Ltd. **751 072**

On Sale 6 April

Heterocyclic compounds. Soc. Des Usines Chimiques Rhone-Poulenc. **791 190**

New insecticidal esters of dithiophosphoric acid. Sandoz Ltd. **795 340**

Hardening of photographic gelatin compositions. Kodak Ltd. **797 321**

Stabilising pastes for resinous compositions. National Lead Co. **798 675**

On Sale 13 April

Cyclopentadiene compounds of transition elements. Union Carbide Corp. **785 760**

ACCEPTANCES

Open to public inspection 6 April

Preparing nitro-5 furfural-2-semi-carbazone. Hellinghuizer-Gerriesen, B. **832 320**

Propellant explosive and method of making same. Recherches Chimiques, S.A. **832 137**

Polymeric compositions. Du Pont De Nemours & Co., E. I. **831 925**

Substituted beta-naphthols and compositions containing same. Et. Clin-Byla. **832 139**

Anaesthetics. Olin Mathieson Chemical Corp. **831 860**

Morpholine derivatives. Searle & Co., G. D. **831 933**

Purification of novobiocin. Upjohn Co. **832 140**

Hydrogenation catalyst and its use in partial hydrogenation of 1, 4-butynediol. General Aniline & Film Corp. **832 141**

Cycloheptatriene-group VIB transition metal carbonyl complexes. Wilkinson, G. **832 142**

Esters of substituted benzilic acids and methods for producing same. Parke, Davis & Co. **831 934**

Production of gaseous unsaturated hydrocarbons. Osterreichische Stickstaffwerke AG. **832 143**

Hydroxylated steroids and methods for their manufacture. Scherico Ltd. [Divided out of 832 214.] **832 325**

Electrolyte for aluminium production. Aluminium Laboratories Ltd. **831 930**

Flat shaped objects comprising a polyalkalene terephthalate and having a heat-sealable coating layer. Kalle & Co. AG. **831 931**

Tantalum-columbium alloy. Sierra Metals Corp. **831 932**

Emulsified oxidised polymer oil latex. Esso Research & Engineering Co. **832 147**

Catalyst manufacture. Universal Oil Products Co. **831 935**

Catalytic hydrogenation of the dinitro derivatives of toluene. Allied Chemical Corp. **832 153**

Separation and purification of cyclodienes. Esso Research & Engineering Co. **832 053**

Stabilised degreasing solvent. Dow Chemical Co. **832 055**

Suspensions of drugs destined for injection and process for the preparation thereof. Organon Laboratories Ltd. **831 907**

Process and apparatus for purifying hydrogen. Union Carbide Corp. **832 060**

Gas mixture rectification apparatus. Lindes Eismaschinen AG. **832 159**

Resolution of lysine. Du Pont De Nemours & Co., E.I. **832 160**

Production of 1-alkoxybutene-(1)-ones-(3). Chemische Werke Hüls AG. **832 162**

Curing ester resins. Allied Chemical Corp. **832 169**

Production of *o*-divinylbenzene. Du Pont De Nemours & Co., E. I. **832 173**

Method for the preparation of 1, 3, 5-triphenyl benzene. Rütgerswerke-AG. **832 176**

Preparation of peracetic acid. Shawinigan Chemicals Ltd. [Addition to 815 353.] **832 337**

Vinylictin compounds and process for preparing same. Metal & Thermit Corp. [Divided out of 824 944.] **832 338**

Open to public inspection 13 April

Electrodeposition of uranium compounds. Kahn, M. **832 494**

Method and apparatus for fractionating of gaseous mixtures. Air Products Inc. **832 607**

Polymerisation of olefins. Ruskin, S. L. **832 483**

Separating phthalic anhydride entrained in gases. Manufactures Des Glaces Et Produits Chimiques De Saint-Gobain, Chauny & Cirey S.A., Des. **832 619**

Continuous production of polyolefins of uniform molecular weight. Bergwerksgesellschaft Hibernia AG. **832 595**

Paints, varnishes and lacquers. Hardman & Holden Ltd. **832 622**

Manufacturing Δ -3, 4-thiazolines. Leuna Werke W. Ulbricht Veb. **832 624**

Manufacture of α-mercapto ketones. Leuna-Werke W. Ulbricht Veb. **832 625**

Antibiotics foromacidins A, B, C & D. hydrogenated foromacidins and forocidines A B, C & D and process for manufacture. Ciba Ltd. **832 627**

Coating of articles with polyvinyl chloride compositions. Imperial Chemical Industries Ltd., Knowles, E., Smith, W. F., and Wood, J. F. **832 629**

Basically substituted phenylhydrazones, the acid addition salts thereof and a process for the manufacture of these compounds. Farbwerke Hoechst AG. **832 517**

Flameless reaction to olefins of gaseous or vaporous saturated hydrocarbons. Badische Anilin- & Soda-Fabrik AG. **832 521**

Grafting polymerisable compounds on to preformed naturally occurring polymers. Polymer Corp. Ltd. **832 692**

Production of polymeric materials. British Rubber Producers Research Assoc. [Cognate applications 18 907 and 21 881.] **832 700**

Separation of gaseous mixtures. Phillips Petroleum Co. **832 639**

Fluid analysis. Union Carbide Corp. **832 703**

Amino-alcohols and amino-esters. Beckett, A. H. **832 490**

Organosiloxanes. Midland Silicones Ltd. **832 487**

Siloxane elastomers. Midland Silicones Ltd. **832 488**

Preparing high polymeric siloxanes. Midland Silicones Ltd. **832 489**

Production of acrylic compounds. Badische Anilin- & Soda-Fabrik AG. **832 492**

Thermoplastic moulding compositions. Imperial Chemical Industries Ltd. **832 820 & 832 823**

Thermoplastic polymeric materials. Imperial Chemical Industries Ltd. [Cognate application 22 620.] **832 821 & 832 822**

Epoxy heat-hardenable and heat-hardened compositions and a process for their preparation. Union Carbide Corp. **832 565**

Polymer compositions. Rohm & Haas Co. **832 567**

Production of calcium carbonate. Diamond Alkali Co. **832 829**

Anthraquinonoid dyestuffs. Imperial Chemical Industries Ltd. [Addition to 781 930.] **832 400**

Heterocyclic compounds and production thereof. Et. Clin-Byla. **832 568**

Purification of silane used in the production of silicon. Standard Telephones & Cables Ltd. **832 570**

Production of acrylic compounds. Badische Anilin- & Soda-Fabrik AG. **832 493**

Process for analysis of gaseous hydrocarbons. Farbenfabriken Bayer AG. **832 423**

Pharmaceutical compositions containing salts of tetracycline or oxytetracycline. Pfizer Corp. **832 424**

Separation of factors A, B and Z, from antibiotic E129. Glaxo Laboratories Ltd. **832 571**

Chemical reactions employing catalysts. Diamond Alkali Co. **832 425**

Concentration of tocopherols. Vitamins Ltd. **832 572**

Dichloro-oxylenol acetate and antifungal formulations containing it. Aspro-Nicholas Ltd. **832 430**

Grafting polymerisable compounds on to preformed polymers. Polymer Corp. Ltd. **832 693**

Electrostatic precipitation of particles from gases Koppers Co. Inc. **832 852**

Catalytic dehydrogenation of N-methyl-pyrrolidine. Imperial Chemical Industries Ltd. **832 855**

Refractories. Monsanto Chemicals Ltd. **832 853**

Recovery of chemical reaction products. Ethyl Corp. **832 861**

Application of chemically-bonded coatings to the surface of aluminium. Amchem Products Inc. **832 485**

Selective reduction of chrome ore. Avesta Jernverks A.B. **832 441**

Manufacture of nitric acid esters of aliphatic alcohols. Nitroglycerine A.B. **832 870**

Process for dyeing of polyacrylonitrile. Farbenfabriken Bayer AG. **832 444**

Upgrading of heavy virgin naphtha. Esso Research & Engineering Co. **832 873**

Coating of fluorinated polymers. Du Pont De Nemours & Co., E. I. **832 874**

Sterilants. Ben Venue Laboratories Inc. **832 659**

Process for reduction of oxidic compounds of iron and similar metals. Johannsen, F. **832 598**

Oxyalkylation of solid polyols. Dow Chemical Co. **832 601**

Process for preparing insulin. Jorpes, J. E., and Linden, J. G. B. **832 456**

Polymerisation of butadiene. Union Chimique Belge S.A. **832 457**

Amino-alcohols and amino-esters. Beckett, A. H. [Divided out of 832 490.] **832 491**

Ignitable compositions. Du Pont De Nemours & Co., E. I. **832 465**

Irradiation of starch. Union Carbide Corp. [Divided out of 832 483.] **832 746**

Process for carrying out oxidation-reduction reactions. Union Carbide Corp. [Divided out of 832 483.] **832 747**

Irradiation of metal alloys. Union Carbide Corp. [Divided out of 832 483.] **832 484**

Preparation of isoprene. Goodyear Tire & Rubber Co. **832 475**

Process for dehydrogenating hydrocarbons. Polymer Corporation Ltd. **832 677**

Compositions of matter for use in making and replenishing baths for application of chemically-bonded coatings to the surface of aluminium. Amchem Products Inc. [Divided out of 832 485.] **832 486**

Open to public inspection 21 April

Sublimation apparatus. Krohn, R. **833 321**

Detergent compositions. Domestos Ltd. **833 201**

Light-sensitive diazotype materials. Murray, H. D., and Parry, E. [Cognate application 3 923.] **832 910**

Water filtration. Smith, E. **833 327**

Dyeability of treated polymeric material. Gevaert Photo-Producten N.V. [Addition to 786 960.] **833 204**

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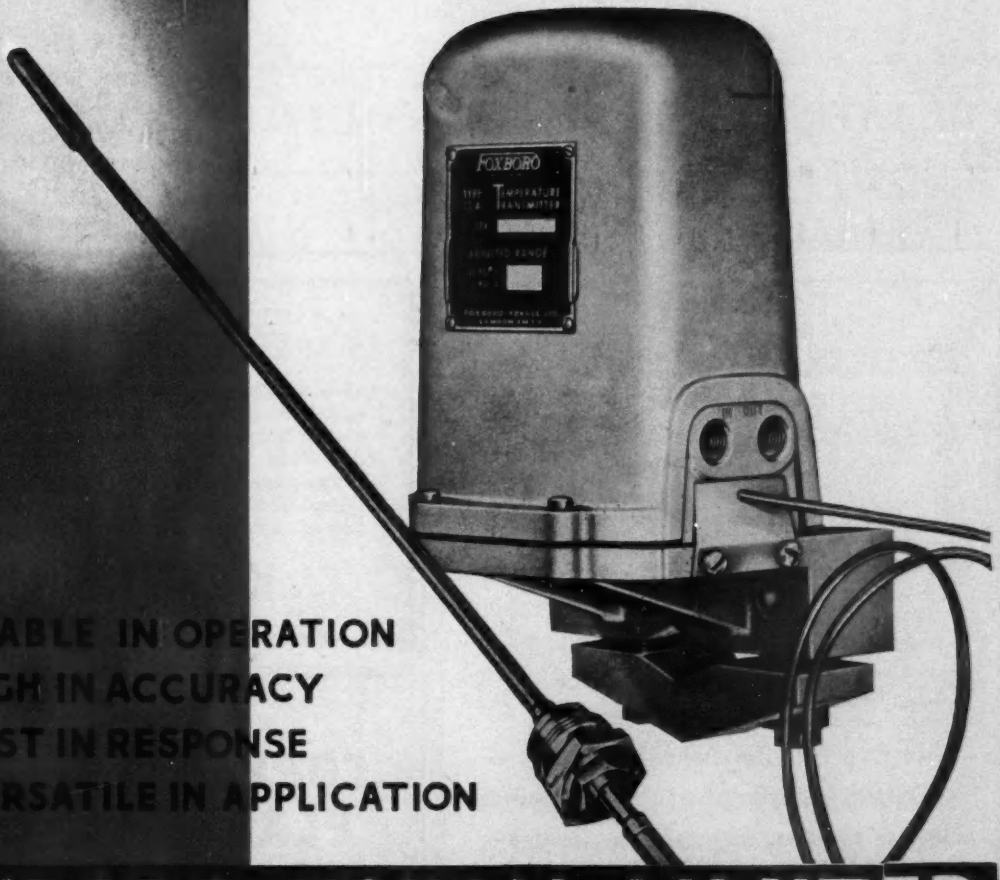

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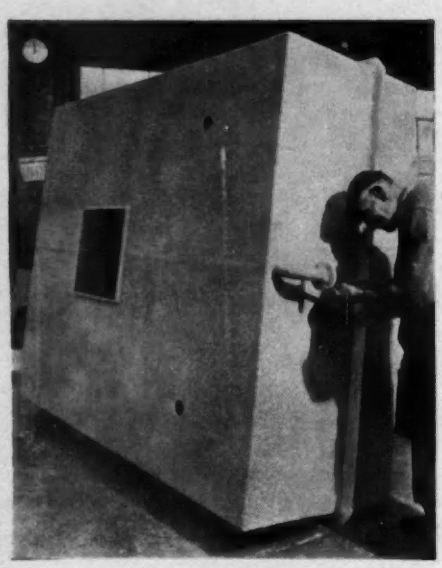

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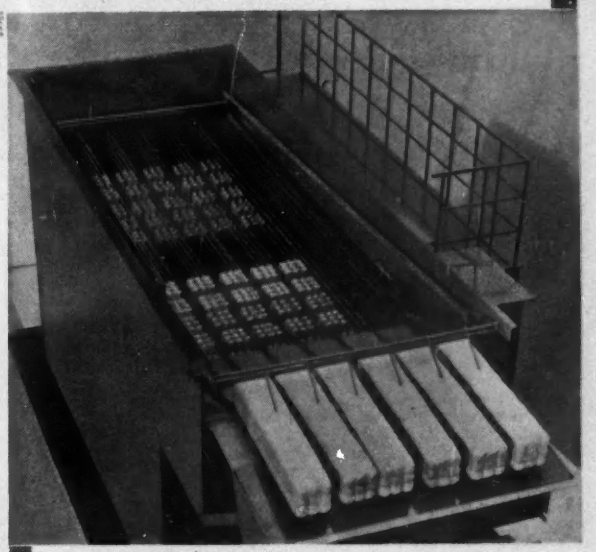

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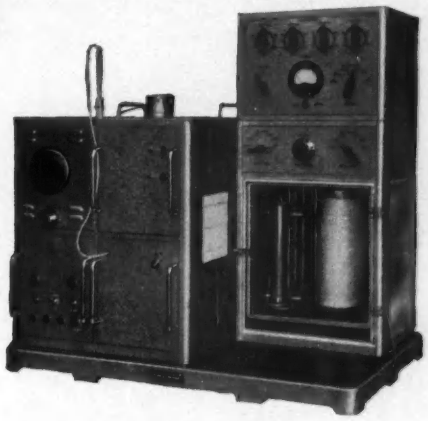

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